RADIOLOGY

A MONTHLY JOURNAL DEVOTED TO CLINICAL RADIOLOGY AND ALLIED SCIENCES

EDITOR

Howard P. Doub, M.D.
Detroit, Michigan

Volume 48

January—June 1947

Owned and Published as its Official Journal by
THE RADIOLOGICAL SOCIETY OF NORTH AMERICA

610.5
gR118
v.48

Copyrighted, 1947, by the
Radiological Society of North America, Inc.

Sept. 24, 1947
B. P.

ARTMOUTH
COLLEGE
LIBRARY

RADIOLOGY

A MONTHLY JOURNAL DEVOTED TO CLINICAL RADIOLOGY AND ALLIED SCIENCES

PUBLISHED BY THE RADIOLOGICAL SOCIETY OF NORTH AMERICA

Vol. 48 JANUARY 1947 No. 1

Treatment of Malignant Tumors of the Testis

Review of 100 Cases[1]

G. M. KELBY, M.D., and K. WILHELM STENSTROM, Ph.D.

University of Minnesota, Minneapolis, Minn.

THE INCIDENCE of malignant testicular tumors is relatively low. It has been estimated by Cade that they constitute 1 to 1.5 per cent of all malignant tumors in males and that they make up about 3 per cent of neoplasms of the genito-urinary tract. Pack and LeFevre reported an incidence of 1 per cent among 16,565 patients with malignant tumors seen at Memorial Hospital, New York, while Dean at the same institute in 1935 found 2.09 per cent of all malignant neoplasms in males to be testicular tumors. In regard to all male hospital admissions, it may be mentioned that Tanner in 1922 found one testicular tumor for every 2,000 patients.

The present study is based on the tumors of the testis treated at the University of Minnesota Hospitals from 1926 to 1943 inclusive. The total number amounted to 100 and they were placed in three groups: 34 cases were not classified as to type, while 37 were seminomas and 29 were carcinomatous mixed tumors.

ETIOLOGY

The average age in this series was for seminoma 37.6 years and for carcinomatous mixed tumors 29.4 years. This is in agreement with the statement of Cade that teratomatous tumors occur chiefly between twenty and forty years, and the seminomas between thirty and fifty.

A history of trauma was obtained in 15 per cent of the cases. This is somewhat lower than in series reported by other authors. Russell Howard obtained a history of trauma in 5 cases out of 27, Nash and Leddy in 21 out of 103. The figures of some authors are as high as 50 per cent.

Cryptorchidism was present in 8 cases. Nash and Leddy reported an incidence of 8.7 per cent and Dean found 35 cases in a series of 245, or 14.3 per cent.

Hydrocele was observed in 6 patients, and in 3 of these a malignant tumor of the testis was discovered during the operation for hydrocele.

CLASSIFICATION

Classification of malignant tumors of the testis is a confused subject, and opinions vary greatly. At the University of Minnesota Hospitals we follow E. T. Bell's classification. Bell states:

"Testicular tumors may be divided into four groups: adult teratomas, carcinomatous mixed tumors, seminomas, and chorionepitheliomas.

"1. Adult teratomas may be typical dermoid cysts containing hair, fatty material, teeth, etc., or they may consist of many small cysts separated by solid tissue. These tumors are rare, develop slowly over many years, and offer relatively good prognosis.

[1] From the Department of Radiology and Physical Therapy of the University of Minnesota and the University Hospitals, Minneapolis, Minn. Accepted for publication in January 1946.

"2. Carcinomatous mixed tumors are soft cellular growths consisting chiefly of epithelium in form of cysts or solid masses of carcinomatous structure. Cartilage and myxomatous tissue may be found scattered through the tumor.

"3. Seminoma is the most common form of testicular neoplasm. It consists chiefly of rounded or polyhedral clear cells arranged in thick solid cords and bearing some resemblance to testicular tubules. Little or no cartilage is present.

"4. Chorionepithelioma is a malignant tumor arising from chorionic epithelium. The great majority develop within the uterus but they arise also in the testes and rarely in other situations. A teratoma of the ovary or mediastinum may develop chiefly as a chorionepithelioma. In the testis the growth is interpreted as a one-sided development of a teratoma. It is distinguished even in its metastases from other tumors by the characteristic syncytial and Langhans cells, occurring independently of villi."

When the present series of cases was discussed with Dr. Bell, he stressed the fact that true testicular teratomas are rare and that the diagnosis could not be made unless the whole tumor were carefully studied. None of the cases in this series which he examined fell into this group and he did not believe that there was enough evidence to classify any of these as adult teratomas. Because of the uncertainty of classification, all available slides were re-examined by Dr. Bell and Dr. McCartney. Only those definitely classified by them were typed; the others are included in the unclassified group. No chorionepitheliomas were encountered in this group of cases. A patient with this diagnosis was, however, treated in 1944.

It is difficult to state how these cases would be arranged in other classifications, but most of the seminomas would probably be called embryonal carcinomas by many pathologists, while the carcinomatous mixed tumors might be interpreted mainly as adenocarcinomas.

SYMPTOMS

The onset of the disease is characteristically insidious. One of the first symptoms noted by the patient is enlargement of the involved testis, and the tumor is often accidentally found. An injury frequently calls attention to the mass, while in other cases the tumor is discovered during a routine physical examination.

As a rule, the tumor is painless during the early stages, but as the disease advances, dull pain and discomfort are usually experienced, as in a number of our cases. Backache, a feeling of fullness, and nausea, sometimes with vomiting, were generally associated with metastasis to the retroperitoneal nodes. Chamberlin and Jamison state that excretion urograms often demonstrate the presence of abdominal metastases before there is any clinical evidence. Dyspnea, cough, and enlarged supraclavicular nodes usually indicate metastasis to the lungs and mediastinum. In a few of our patients, however, supraclavicular nodes appeared without any sign of metastasis in the chest.

METASTASES

Metastases were known to be present in 65 per cent of our series, the most common site being the retroperitoneal nodes. Thirty patients had palpable abdominal masses at the beginning of irradiation. In most of these cases the usual symptoms of backache, a feeling of fullness, nausea, and abdominal discomfort were present.

Metastasis to the inguinal region was next in frequency. Eighteen patients showed either involvement of the inguinal nodes or a more superficial mass in the scar from the previous incision. Metastasis to the inguinal nodes is an advanced finding and indicates perforation of the capsule of the testis.

Twelve patients had metastases in the lungs and 6 showed mediastinal masses without demonstrable pulmonary involvement. In 6 cases a left supraclavicular node was enlarged. Four patients had clinical evidence of metastasis to the brain.

Metastasis to the retroperitoneal nodes cannot be established until large masses are present. Early involvement of these nodes cannot be determined by palpation, nor is it demonstrable directly or indirectly on the x-ray film. It is probable that undiagnosed metastatic nodes are present in most of our other patients, particularly in those

with highly malignant seminomas. It is for this reason that radiation therapy is given routinely to the retroperitoneal chain of lymph nodes whenever a diagnosis of seminoma has been made following simple orchiectomy.

Metastases in the mediastinum, lungs, and superficial nodes can be demonstrated before they have become too large for adequate treatment. As irradiation to all these areas would mean considerable hardship for the patient, we have applied x-ray therapy only for proved involvement.

DIAGNOSIS

Early diagnosis of malignant testicular tumors is of the utmost importance in order that adequate treatment may be instituted before extensive dissemination has occurred. In our series, 65 per cent of the patients had evident metastases on reporting for irradiation. Dean states that within three months of the first symptoms, 67 per cent of these tumors have metastasized.

A diagnosis of testicular tumor should be made from clinical examination. The physical examination should be complete and include a blood test for syphilis and biological tests for gonadotropic hormones. Biopsy is not advisable, but the testis should be removed for histologic study if malignant growth is suspected. Malignant testicular tumors should be differentiated from hematocele, gumma, benign tumor, tuberculosis, and hydrocele.

TREATMENT

The treatment of malignant tumors of the testis was at first surgical, and consisted of simple orchiectomy. The results were not encouraging. Hinman reported 258 cases with 5.6 per cent five-year cures. Similar results have been obtained by other American and European surgeons.

Radical surgery was next advocated by Chevassu and Hinman. The procedure consisted of removal of the primary lesion and the lymphatics from the testis, including the retroperitoneal nodes. Hinman, in 1933, reported 100 cases in which radical surgery had been performed, with 17 per cent five-year cures. In 1938 he published a series of 58 cases, in only 3 of which radical operation was performed.

The present day treatment of testicular tumors in various clinics consists of simple orchiectomy followed by irradiation. Preoperative irradiation is advocated by some. In simple orchiectomy as performed by Hinman and others, through an inguinal incision, the spermatic cord is clamped and cut high at the internal abdominal ring with a cautery, after which the testicle is removed.

It seems advisable to classify the tumors carefully and use a specific method of therapy for each type. It is our opinion that carcinomatous mixed tumors should be treated by radical dissection if the patient's condition permits, and that seminomas be treated by simple orchiectomy and postoperative irradiation to the retroperitoneal nodes. Adult teratoma should be treated by simple orchiectomy only.

The plan of treatment followed at the University of Minnesota Hospitals up to the present time has been simple orchiectomy followed immediately by irradiation (220 kv.p., 15 ma., 1 mm. Cu plus 1 mm. Al filter, h.v.l. 1.7 mm. Cu, target-skin distance 70 cm.). Patients without clinical evidence of metastasis were treated through two abdominal fields, one anterior and one posterior, the size of the field depending on the case. The anterior field covered an area from the xiphoid process to the pubis, about 15 cm. wide, with a corresponding posterior field. At the present time two anterior fields are used, one for the upper abdomen and a lower field which includes the inguinal region of the involved side. The posterior field is used as before. About 2,000 r in air were given to each field over a period of three weeks. The average daily dose was 200 r in air.

If a large abdominal mass was present, intense treatment was at first directed to that area only; later, other areas were treated if local response had been obtained and the patient had recovered from the debilitating effect of the earlier therapy.

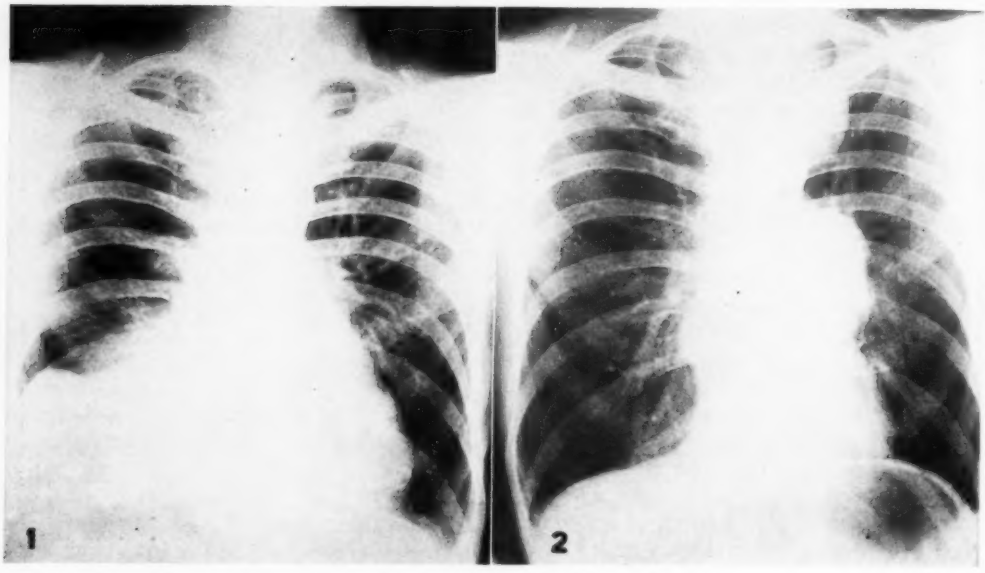


Fig. 1. Roentgenogram of chest made Jan. 27, 1943. Note pleural effusion on right, producing pseudo-diaphragmatic shadow. In addition, there is some elevation of the diaphragm probably from a large abdominal mass. There is no evidence of peripheral metastasis but there is some enlargement of the hilar shadow on the right, with some atelectasis of the right lower lobe, indicating a metastasis in the mediastinum. (Report by L. Rigler.)

Fig. 2. Roentgenogram of chest made May 11, 1943. The right diaphragm is now normal in position and the effusion has disappeared. Three large masses in the mediastinum, representing metastases in the right and left peribronchial and in the left peritracheal groups of lymph nodes, are now apparent. Note the emphysematous lungs and the absence of peripheral metastases. There is a shadow in the left upper lobe, probably representing an old healed minimal tuberculosis. (Report by L. Rigler.)

The usual measures were taken to reduce irradiation sickness to a minimum.

RESULTS OF TREATMENT

In this report it should be noted that survival time is consistently figured from the first x-ray treatment given at the University Hospitals.

1. *Seminomas* (*Table I*): Thirty-seven, or 56 per cent, of the 66 classified cases in which histologic diagnosis had been verified were seminomas; 65 per cent of the patients in this group had known metastasis when irradiation was begun.

The average period of time elapsing between surgical operation and the beginning of irradiation was three and a half months. Orchiectomy was performed by local surgeons in many of our cases, and some of the patients failed to report for follow-up treatment until new symptoms had developed.

In all but 2 cases of the seminoma group simple orchiectomy was performed, followed by irradiation. In 2 cases treatment was by orchiectomy, Hinman's type of dissection, and irradiation. One of the 2 patients survived ten years and when last heard from, in October 1943, had no evidence of recurrence. The other survived

TABLE I: THIRTY-SEVEN CASES OF PROVED SEMINOMA OF THE TESTIS

Year	No. of Cases	Years of Survival									
		1	2	3	4	5	6	7	8	9	10
1930	1	1	1	1	1	1	1	1	1	1	1
1931	0	0	0	0	0	0	0	0	0	0	0
1932	1	1	1	1	1	1	1	1	1	1	1
1933	6	6	4	3	3	3	3	3	2	2	2
1934	2	2	1	0	0	0	0	0	0	0	
1935	1	1	1	1	1	1	1	1	0		
1936	2	2	2	2	2	2	2	2			
1937	1	0	0	0	0	0	0				
1938	2	2	1	1	1	1					
1939	5	4	4	4	4						
1940	3	2	2	2							
1941	1	1	0								
1942	6	3									
1943	6										
No. cases	37	31	25	24	21	16	14	13	11	10	8
No. living		25	17	15	13	9	8	8	4	4	4
Per cent		81	68	62	62	56					

two years. Of all those with seminomas, 56 per cent survived five years or more.

To show the radiosensitivity of seminomas we cite the following case.

W. K., aged 48, was examined at the University Hospitals on Jan. 26, 1943. When he was first seen by his physician, in September 1942, his complaints were swelling of the right testicle, first noticed in July 1942, backache, nausea, a feeling of fullness, 30 pounds weight loss, and weakness. A diagnosis of right hydrocele was made and surgery was advised.

On Nov. 10, 1942, the patient was operated upon. A tumor was then discovered in the right testicle, and a simple orchiectomy was performed. The histologic diagnosis was seminoma.

On Jan. 26, 1943, the patient came to the University Hospitals for x-ray therapy. He appeared well developed but emaciated. No lymph nodes were palpable. The upper mediastinum seemed to be widened. There were dullness, diminished breath sounds, and increased fremitus at the base of the right lung posteriorly. The heart was slightly enlarged to the left, and there was a loud systolic murmur at the apex.

There was a large hard mass in the epigastrium measuring about 10 × 14 cm., extending below and to the right of the umbilicus. The mass was fixed posteriorly. The liver and spleen were not palpable. There was some shifting flank dullness. Prominent veins were seen extending up over the abdomen to the chest. No peripheral edema was observed. A draining sinus was seen in the right scrotum, and the right testicle was absent.

The laboratory findings were as follows: urine negative; hemoglobin 10.4 gm., leukocytes 5,280 (89 per cent neutrophils, 7 per cent lymphocytes, and 4 per cent monocytes).

A film of the chest showed marked elevation of the right diaphragm, which, it was believed, might be due to the large abdominal mass (Fig. 1).

A review of the section from the removed tumor verified the diagnosis of seminoma of the testis.

Irradiation was directed to the abdominal mass and 2,200 r in air were given to each of two fields, one anterior and one posterior. This series of treatment was started on Jan. 26, 1943, and completed Feb. 24, 1943. The mass was quite resistant to irradiation and receded very slowly. The patient was then given a ten-day period of rest so that he might recuperate from the effect of irradiation. He was to return for examination and further treatment if needed. He did not report back, however, until May 5, 1943. Examination now showed a palpable left supraclavicular node and extensive metastases in the mediastinum (Fig. 2). There had been a gain of 12 pounds in weight.

Irradiation was again instituted, and 1100 r in air were given to each of two fields, anterior and posterior, to the mediastinum, and the left supraclavicular region, being completed in fourteen days.

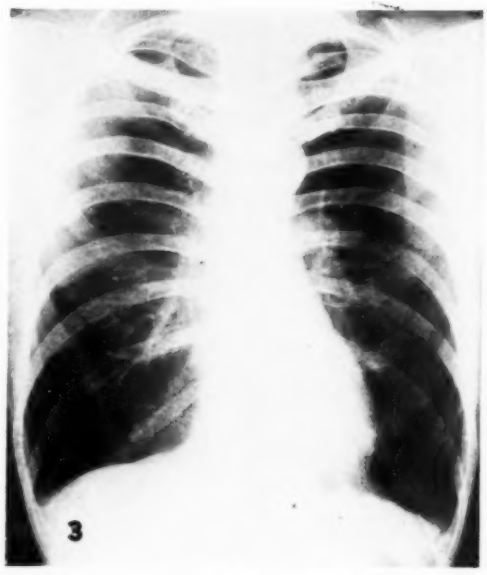


Fig. 3. Roentgenogram of the chest made Oct. 26, 1944. This is one of a number of examinations made between July 8, 1943, and Nov. 8, 1945, in all of which emphysematous lungs without evidence of metastases or other lesions, aside from the scar in the left upper lobe, were shown. Note the complete absence of any sign of the enlarged lymph node masses observed prior to radiation therapy. (Report by L. Rigler.)

An x-ray film on July 8, 1943, was negative and subsequent x-ray examinations revealed no recurrence of metastases in the mediastinum or lungs (Fig. 3). There was no palpable mass in the abdomen at the last examination, Nov. 8, 1945.

The patient returned to his former occupation in the summer of 1943. He regained his normal weight and remained in good health until December 1945. We have been informed that his condition suddenly became serious and that he expired Dec. 29, 1945. Autopsy could not be obtained.

2. *Carcinomatous Mixed Tumors* (*Table II*): There were 29 patients in this group. Twenty-five had metastases when irradiation was begun. Only one patient survived five years. This group is radioresistant and in our experience irradiation is of little value.

3. *Unclassified Group* (*Table III*): The unclassified group consisted of 34 cases. In 28 of these a microscopic diagnosis of malignant tumor was made. A clinical diagnosis was made in 6 cases. Twenty-four patients in this group had metastases at the beginning of treatment. Six with extensive metastasis had no operation but

TABLE II: TWENTY-NINE CASES OF PROVED CARCINOMATOUS MIXED TUMORS OF THE TESTIS

Year	No. of Cases	Years of Survival					
		1	2	3	4	5	6
1926	1	1	1	0	0	0	0
1927	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0
1929	2	0	0	0	0	0	0
1930	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0
1932	3	1	1	0	0	0	0
1933	2	1	0	0	0	0	0
1934	1	0	0	0	0	0	0
1935	2	1	0	0	0	0	0
1936	2	1	0	0	0	0	0
1937	3	3	3	1	1	1	1
1938	3	1	0	0	0	0	
1939	1	1	0	0	0		
1940	2	1	0	0			
1941	3	0	0				
1942	2	0					
1943	2						
No. cases	29	27	25	22	20	19	16
No. living		11	5	1	1	1	1
Per cent		41	20	5			

were irradiated; none of these patients survived five years.

Twenty-nine per cent of the unclassified group were alive after five years. It is likely that many of these cases were actually seminomas.

Entire Series: In all, 65 patients with malignant testicular tumors were treated more than five years ago. Of these patients 18, or 29 per cent, survived five years or more.

Hinman has made the statement that the metastatic lesions from one type of testicular tumor may show the structure of another type and that classification, therefore, is of limited value. Though such changes may occur, they have not been encountered in this series, and the response to treatment has followed the predictions closely. We have not encountered any carcinomatous mixed tumors which were favorably influenced by x-ray therapy. The seminomas, on the other hand, consistently responded to irradiation, and some of the patients with distant metastases became free from symptoms and have remained well up to the present time. It therefore seems that Bell's classification is useful if carefully followed. We wish here to express our gratitude to Dr. E. T. Bell and Dr. J. S. McCartney for their willingness to re-examine the slides and thus make it possible for us to obtain reliable correlation between the specific types of malignant testicular tumor and the results of treatment.

TABLE III: THIRTY-FOUR UNCLASSIFIED CASES OF MALIGNANT TUMORS OF THE TESTIS

Year	No. of Cases	Years of Survival									
		1	2	3	4	5	6	7	8	9	10
1926	1	1	0	0	0	0	0	0	0	0	0
1927	1	1	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	0
1929	3	1	0	0	0	0	0	0	0	0	0
1930	2	0	0	0	0	0	0	0	0	0	0
1931	1	1	0	0	0	0	0	0	0	0	0
1932	4	1	1	1	1	1	1	1	1	1	0
1933	0	0	0	0	0	0	0	0	0	0	0
1934	4	4	1	1	0	0	0	0	0	0	
1935	4	2	1	1	1	1	1	1	1		
1936	3	3	3	2	2	2	2	2			
1937	2	2	2	2	2	2	2				
1938	3	3	2	2	2	2					
1939	2	2	2	2	2						
1940	2	0	0	0							
1941	2	2	2								
1942	0	0									
1943	0										
No. cases	34	34	34	32	30	28	25	23	20	16	12
No. living		23	14	11	10	8	6	4	2	1	0
Per cent		68	41	34	33	29	24				

CONCLUSIONS

1. Tumor of the testis is frequently found in patients with hydrocele.
2. As in all malignant tumors, early diagnosis is of utmost importance.
3. A differential diagnosis should be made (histologically) so that each testicular tumor can be classified correctly.
4. Seminoma is a malignant tumor which forms metastases rapidly.
5. Seminomas of the testis are radiosensitive. The patient should have the benefit of x-ray therapy regardless of the stage of metastasis present.
6. There should be no delay in instituting irradiation following simple orchiectomy.
7. Frequent follow-up examinations should be done.
8. Simple orchiectomy followed by irradiation is the treatment of choice in seminomas.
9. The carcinomatous mixed tumors should be treated by radical dissection, and adult teratoma by simple orchiectomy.

SUMMARY

1. An analysis has been made of 100 cases of malignant tumor of the testis seen at the University of Minnesota Hospitals from 1926 to 1943 inclusive.

2. Bell's classification of malignant testicular tumors has been used in this report. According to this, the group consisted of 34 unclassified cases, 37 seminomas, and 29 carcinomatous mixed tumors.

3. For seminomas the age incidence was slightly higher than for carcinomatous mixed tumors.

4. Metastasis was known to be present before irradiation was started in 65 per cent of the seminomas, 86 per cent of the carcinomatous mixed tumors, and 70 per cent of the unclassified group.

5. Therapy consisted of simple orchiectomy and irradiation in 90 cases, irradiation alone in 6 advanced cases, and Hinman's operation and irradiation in 4 cases.

6. Results of therapy can be summarized as follows: In seminomas of the testis the five-year survival rate is 56 per cent. In the carcinomatous mixed tumor group only 1 patient survived five years, while in the unclassified group, 29 per cent survived five years. If all the patients with malignant testicular tumors are considered together, a five-year survival rate of 29 per cent was obtained.

7. There were 4 cases in which the combination of Hinman's dissection and irradiation was used, with one five-year survival. Six advanced cases were treated with irradiation alone, with no five-year survival.

906 Medical Arts Building
Minneapolis, Minn.

REFERENCES

ALLEN, L.: Lymphatics of the Parietal Tunica Vaginalis Propria of Man. Anat. Rec. **85:** 427–432, 1943.

ADAMS, A. W.: Testicular Tumors: Nine Cases, Including Epididymoma and Chorioma. Brit. J. Surg. **28:** 119–123, 1940.

BARNER, J. L.: Teratoma of the Testis: Report of 65 Cases. Am. J. Roentgenol. **54:** 257–261, 1945.

BELL, E. T.: Textbook of Pathology. Philadelphia, Lea & Febiger, 5th Ed., 1944, pp. 377–378.

BELT, E.: Tumors of the Testicle. Am. J. Surg. **38:** 201–219, 1937.

BOYD, W. B.: Surgical Pathology. Philadelphia, W. B. Saunders Co., 4th Ed., 1944, pp. 485–488.

CABOT, H., AND BERKSON, J.: Neoplasms of the Testis: Study of Results of Orchidectomy, With and Without Irradiation. New England J. Med. **220:** 192–195, 1939.

CADE, STANFORD: Malignant Disease and Its Treatment by Radium. Bristol, John Wright & Sons, 1940, pp. 920–938.

CHAMBERLIN, G. W., AND JAMISON, J. H.: Treatment of Malignant Tumors of the Testis. Am. J. Roentgenol. **46:** 850–865, 1941.

DEAN, A. L., JR.: Teratoid Tumors of the Testis. J. A. M. A. **105:** 1965–1971, 1935.

DESJARDINS, A. U.: Method in Radiotherapy. Radiology **30:** 57–61, 1938.

ENFIELD, C. D.: Radiation Treatment of Testicular Tumors. Urol. & Cutan. Rev. **44:** 380–383, 1940.

EWING, JAMES: Neoplastic Diseases. Philadelphia, W. B. Saunders Co., 4th ed., 1940, pp. 834–850.

FERGUSON, R. S.: Selective Irradiation in the Management of Teratoma Testis. J. Urol. **34:** 458–461 1935.

GORDON-TAYLOR, G., AND TILL, A. S.: On Malignant Disease of the Testicle, with Special Reference to Neoplasms of the Undescended Organ. Brit. J. Urol. **10:** 1–45, 1938.

HINMAN, F.: Tumors of the Testis: Five Year Cures Following Radical Operation. Surg., Gynec. & Obst. **56:** 450–461, 1933.

HINMAN, F.: Prognosis and Treatment of Tumors of the Testis. J. Urol. **34:** 72–84, 1935.

HINMAN, F.: Radical Operation for Teratoma Testis. In Pack and Livingston's Treatment of Cancer and Allied Diseases, New York, Paul B. Hoeber, 1940, Vol. III, pp. 1935–1947.

HINMAN, F., AND BENTEEN, F. H.: Relationship of Cryptorchidism to Tumor of the Testis. J. Urol. **35:** 378–381, 1936.

HINMAN, F., JOHNSON, C. M., AND CARR, J. L.: Clinico-Pathologic Classification of Tumors of the Testis in Relation to Prognosis. Tr. Am. A. Genito-Urin. Surgeons **34:** 211–225, 1941.

HINMAN, F., AND POWELL, T. O.: Gonadotropic Hormone in the Urine of Men with Tumor of the Testis. J. Urol. **34:** 55–71, 1935.

HINMAN, F., AND POWELL, T. O.: Management of Tumor of Testicle. J. A. M. A. **110:** 188–190, 1938.

LEDDY, E. T., AND DESJARDINS, A. U.: Tumors of the Testis. Radiology **31:** 293–298, 1938.

LEVITT, W. M.: in Discussion on Diagnosis and Treatment of Neoplasms of the Testis. Proc. Roy. Soc. Med. **32:** 663–670, 1939.

NASH, L. A., AND LEDDY, E. T.: Seminoma of the Testis from the Standpoint of Roentgen Treatment. Am. J. Roentgenol. **50:** 162–196, 1943.

NEWSOM, S.: Malignant Disease of the Testis, with Report of a Case of Seminoma, Presenting a Problem in Diagnosis. J. Roy. Army M. Corps **79:** 233–239, 1942.

RANDALL, A., AND BOTHE, A. E.: Value of Preoperative Irradiation in Tumors of the Testis. Ann. Surg. **105:** 385–391, 1937.

STEWART, F. W.: Radiosensitivity of Tumors. Monograph No. 1, American Society for Control of Cancer, pp. 54–57.

TANNER, C. C.: Tumors of the Testicle, with Analysis of 100 Original Cases. Surg., Gynec. & Obst. **35:** 565–572, 1922.

Simultaneous Radiographic and Gastroscopic Examination of the Stomach[1]

CARLTON L. OULD, M.D., and MORRIS E. DAILEY, M.D.
San Francisco, Calif.

THE CORRELATION of the radiographic and gastroscopic findings in gastritis, ulcer, and cancer has been thoroughly studied (1, 2, 3).[2] It seems generally agreed that the roentgenologic diagnosis of gastritis is exceedingly difficult for, as Templeton and Schindler (2) have shown, the rugae of the normal stomach may have the same appearance in a roentgenogram as those of the gastritic stomach. In fact, in proved cases of pronounced atrophy, large folds may be seen in the barium-filled stomach. The relief technic may demonstrate folds radiating in a stellate fashion toward an ulcer, but when the area is examined gastroscopically no hint of such folds may be seen. Clearly, convergence of these folds is not due to fibrosis or other permanent change (4), but most probably is related to Forssell's autoplastic phenomenon (5). Certain structures, such as the angularis, seen at gastroscopy, may not be readily recognized at the barium examination. The large, rope-like antral sphincter which crosses the greater curvature is usually seen at gastroscopy but seldom, if ever, in a roentgenogram (6). In an attempt to clarify these differences in the radiographic and gastroscopic appearance of the stomach, the present study was undertaken. It was hoped, also, to obtain some understanding of the cause and extent of the gastroscopic "blind areas" (Fig. 1).

In order to visualize the mucosa, a medium had to be found which would give satisfactory contrast on the films, yet be relatively transparent at gastroscopy. The ideal medium should, in addition, cling to the mucosa, not distort the stomach, and not have an objectionable taste. Although umbrathor has been used in the

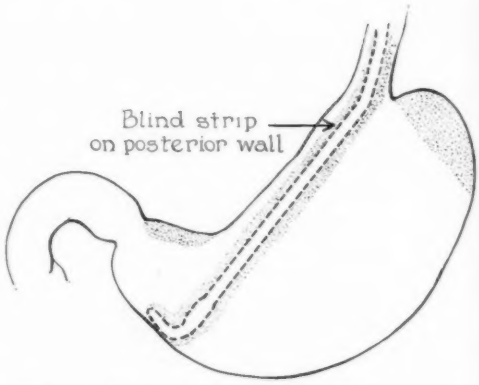


Fig. 1. Diagrammatic sketch with gastroscope inserted, showing the three "blind areas" of the stomach.

radiologic examination of the gastro-intestinal tract (7), no other medium was available which met our needs. Therefore, with normal males as subjects, different media were studied in an attempt to find the most suitable agent. The data on these studies are summarized in Table I. In general, each mixture had two components, one for radiopacity and another to enhance adherence to the mucosa.

The most acceptable agent for rendering the various contrast media more adhesive proved to be methyl cellulose. This substance is a white, fibrous cellulose ether, soluble in cold water but insoluble in hot water and in most organic solvents. Its solutions are colorless and tasteless, while its lack of toxicity has been fully demonstrated in rats by Deichmann and Witherup (8). Machle, Heyroth, and Witherup (9) could find no toxic effect in human subjects, a large portion of the methyl cellulose being recovered unchanged in the feces. In addition, there was no evidence of sig-

[1] From the Department of Radiology and the Division of Medicine, University of California Medical School, San Francisco, Calif. Accepted in February 1946.
[2] Hufford and Stonehouse (14) examined two normal subjects and reported their findings.

TABLE I: DATA CONCERNING MATERIALS TESTED FOR VISUALIZATION OF STOMACH

Substance	Thickening Agent	Physical Appearance	Radiographic Density of Material in Stomach*	Degree of Adherence*	Sharpness of Mucosal Pattern*
Brominal, 30 c.c.	Methyl cellulose, 30 c.c.	Jelly-like, clear	E	F	P
Diodrast, 30 c.c.	Pectin, methyl cellulose, 30 c.c. each	Jelly-like, clear	F	P	P
Diodrast, 30 c.c.	Pectin, 30 c.c.	Jelly-like, amber	E	F	P
Diodrast, 30 c.c.	Methyl cellulose, 30 c.c.	Jelly-like, clear	E	F	E
Iodo-chloral, 30 c.c.	Methyl cellulose, 30 c.c.	Viscid, lumpy liquid	E	P	P
Neo-iopax, 20 c.c.	None	Clear liquid	E	F	P
Neo-iopax†, 20 c.c.	Methyl cellulose, 20 c.c.	Jelly-like, clear	E	P	F
Pantopaque, 30 c.c.	None	Dark liquid	E	E	E
Pantopaque, 18 c.c.	Methyl cellulose, 20 c.c.	Viscid, dark liquid	E	F	F
Umbrathor, 30 c.c.	Pectin, 30 c.c.	Opaque, thick liquid	F	E	P
Umbrathor, 60 c.c.	None	Thin liquid	E	F	F
Umbrathor, 30 c.c.	Methyl cellulose, 30 c.c.	Thick, fairly clear liquid	F	F	F

* Letters used express the following degrees: poor P, fair F, excellent E.
† This was the only medium which was not acceptable in taste.

nificant absorption of toxic breakdown products. Some mixtures were obviously unsuitable, due to clumping, while others could not be tolerated because of their taste. The high cost of a very excellent medium (pantopaque) prevented its routine use. The medium finally selected by us for our studies was composed of equal parts of diodrast and a saturated aqueous solution of methyl cellulose.

Prior to the simultaneous radiographic and gastroscopic examination of the patient it seemed desirable to determine what zones of the stomach could be visualized by the gastroscope. For that purpose, the stomach of a fresh cadaver was suspended and inflated without distortion on rubber strips stretched between parallel metal bars. Its orientation was that which it would take in life with the body on the left side, the position assumed at gastroscopy. The cardia was fixed, but the pylorus was somewhat movable and anterior, as in life (6, 10, 11). The specimen was then examined gastroscopically, using the standard flexible instrument with a visual angle of 45° and a focal distance of 0.5 cm. (12). With the gastroscope inserted along the posterior wall, where Schindler has stated it rests (13), the areas which could be visualized corresponded very well with those observed in life. Thus the fundus, the lesser curvature between the angularis and pylorus, as well as a strip of the posterior wall were in blind areas. No calculations were made of the total area of the blind zones, but further studies are planned to determine their extent.

Four patients, three of whom had had previous gastroscopy, were examined in the course of our study. After preliminary atropine and codeine medication, each patient's pharynx was anesthetized with 2 per cent pontocaine hydrochloride; no sedation was used, and just prior to the examination the fasting contents were evacuated by gravity, using an Ewald tube. Immediately after emptying the stomach, 60 c.c. of the methyl cellulose-diodrast mixture were instilled and the gastroscope was promptly inserted while the patient was lying on his left side on the radiographic table, the head being supported by an assistant. By this method a sharp, round image of the mucosa was obtained, and vision was clear at any angulation so long as the flexible portion of the gastroscope deviated no more than 30° from the long axis. Roentgenograms were taken in the left lateral and anterior-posterior projections, recording the position of the gastroscope at the moment the gastroscopist visualized important landmarks in the stomach.

We have calculated that as much as 1,500 to 2,000 c.c. of air may be introduced into the stomach during the course of a routine gastroscopy. The films demon-

Fig. 2. Lateral projection. The instrument is 2 inches below the cardia, the tip gliding on the posterior gastric wall. The duodenum, filled with gas, is located behind the posterior wall. A. Posterior wall of stomach, along which the tip of the gastroscope is gliding. B. Gas in duodenum and jejunum, pressing lower portion of stomach anteriorly.

Fig. 3. Lateral projection. A. Posterior wall on which the instrument is resting. B. Edge of angularis seen around the dark cavity of the antrum. Compare with Fig. 7.

strated that there was a considerable amount of air distending not only the stomach but the duodenum and upper small intestine as well. This surprising amount of air in the small bowel, increasing in volume as the examination progresses, pushes the stomach anteriorly and may in some instances distort its lower pole considerably (Figs. 2 and 3). These effects of distention are, no doubt, the reason why in another instance it glided along the posterior wall almost immediately after passing the cardia (Figs. 2 and 4). This second situation would result in a large blind area on the posterior wall because of the inadequate focal distance,[3] while if the instrument fortuitously failed to engage the posterior wall until the lower depth was reached, the bulk of the upper posterior wall could be seen.

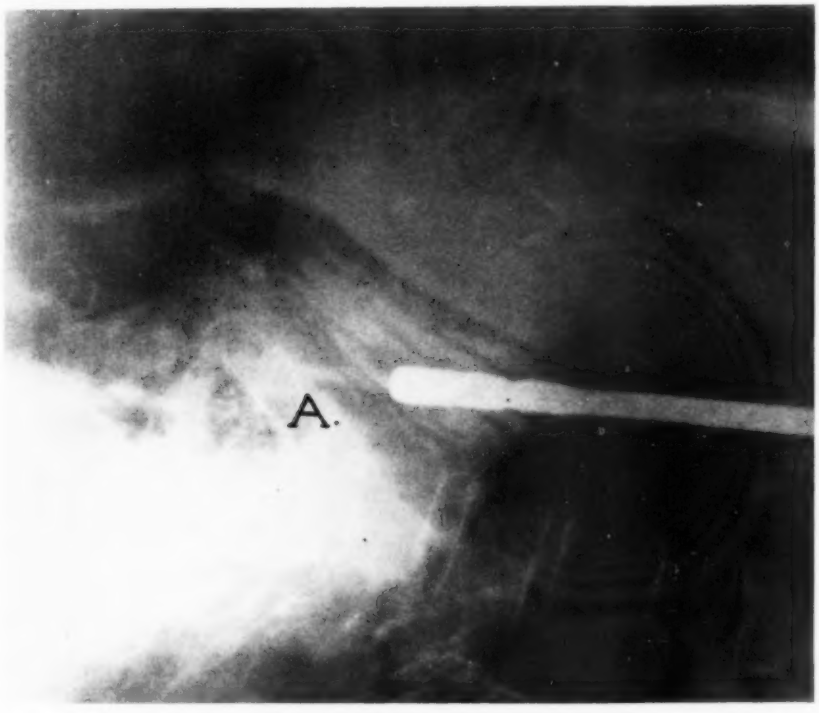


Fig. 4. Lateral projection. A. Tip of gastroscope just meeting the posterior wall of the stomach, in spite of the instrument being close to the antrum. Compare with Fig. 2, where the gastroscope is seen impinging on the posterior wall soon after passing the cardia.

inexperienced gastroscopists, when they introduce air too rapidly, fail to visualize the pylorus.

In the study of the gastroscopic blind areas, an interesting and important point observed is the variation in the relationship of the instrument to the posterior wall, due to different types of body habitus. In one case the gastroscope reached the lower third of the stomach before it impinged on the posterior wall (Fig. 3), while

A second so-called blind area for gastroscopists is the lowermost lesser curvature, which is hidden by the angulus, even when the pylorus is fully visualized. This zone varies with the angulation of the antrum and body of the stomach and, as noted pre-

[3] Some of the difficulty in visualizing mucosal areas too close to the gastroscope seems due in part to the fact that the light source is separated from the objective. The field therefore becomes dark, not due to inadequate focal distance *per se*, but rather because the objective is outside the cone of light of the lamp

Fig. 5. Anterior-posterior projection. Gastroscope at full insertion, with stomach completely dropped to the left of the spine. A. Angulus seen at edge of antrum. B. Polypoid carcinoma dimly outlined in antrum.

Fig. 6. Anterior-posterior projection. Marked persistent deformity of pyloric antrum due to carcinoma (same patient as Fig. 5).

viously, by the amount of air introduced into the upper bowel. Respiratory movements and peristaltic waves, however, may transiently bring portions of the mucosa into view from behind the angulus.

The fundus of the stomach cannot be seen at gastroscopy simply because no retrograde vision is possible. The films suggest that this area may be increased in extent by over-distention of the stomach, causing more of the fundus to dome above the cardia.

Even with this medium of little weight the stomach is seen to pass well across the spine to the left, or lowermost, side of the body (Figs. 5 and 6). This extensive mobility may well be significantly reduced in cases where perigastric inflammatory or neoplastic infiltration and adhesions have fixed the stomach. Roentgenologic studies might prove this to be a differential point of importance, for it is known, for instance, that when the pylorus is seen abnormally far posteriorly on gastroscopy, the presence of a penetrating duodenal ulcer is suggested.

The medium was satisfactory under ordinary fluoroscopic conditions. However, because the stomach was distended with air, and because this material settled and pooled in the most dependent portion, our medium was of little help in demonstrating details of the gastric mucosa. On the other hand, the air tended to make the cavity of the antrum visible (Figs. 3 and 7), and in one case even the ligament of Treitz was recognizable (Fig. 8).

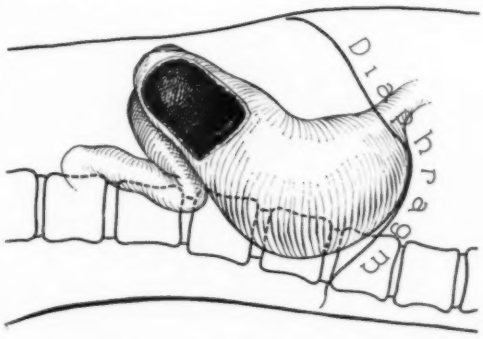


Fig. 7. Diagrammatic sketch of a lateral view of the stomach, revealing the recession of the cavity of the pyloric antrum toward the duodenum. Compare with the antral cavity in Fig. 3.

COMMENT

This study suggests that the zones visualizable at gastroscopy could be increased by a slight change in the instrument. If the source of light were not separated from the objective, the angle of vision and the cone of light would more nicely coincide. This, we feel, would make it possible to see more of the posterior wall. The new omni-angle gastroscope, by allowing the angulation of the objective to be shifted at will during an examination, has somewhat reduced the extent of the areas hidden behind the angulus and near the cardia.

The methyl cellulose-diodrast mixture, with the usual relief methods, gave satisfactory results. Since this medium does not distort the stomach by its weight, a complete investigation of the limitation of gastric mobility in disease may be very profitable. Neoplasms confined to the stomach may not prevent the organ from shifting across the spine (in the left lateral position), while if extension to surrounding structures has occurred, the orientation of the stomach in the abdominal cavity may be restricted. Perigastric fibrosis and inflammation due to duodenal or gastric ulcers may reduce gastric mobility, which we have shown to be quite extensive with the patient turned on his side. This method would have real clinical value if, thereby, radiologists could inform surgeons that a pathologic process had extended beyond the stomach.

SUMMARY

1. The appearance of the gastric mucosa was studied by means of simultaneous radiographic and gastroscopic examination.

2. A contrast medium composed of equal parts of diodrast and a saturated aqueous solution of methyl cellulose was found to be satisfactory for mucosal relief studies.

3. Certain factors which influence the

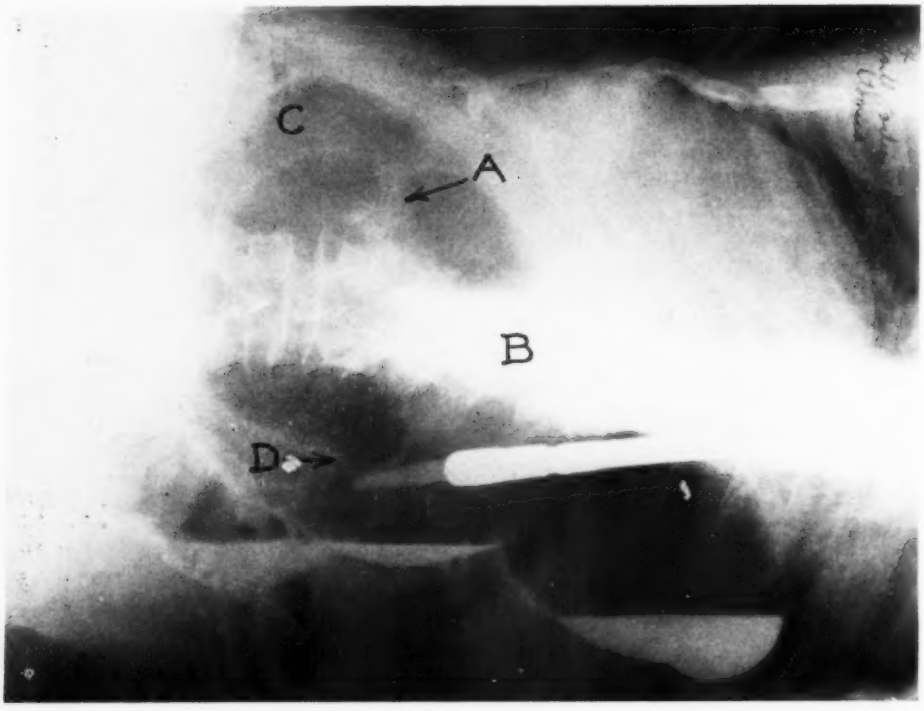


Fig. 8. Anterior-posterior projection. Gastroscope at mid-insertion. The diodrast mixture has pooled at both levels of the cascade stomach. A. Pyloric sphincter. B. Diodrast mixture in duodenal cap. C. Gas-filled second portion of duodenum. D. Ligament of Treitz.

extent of the gastroscopic blind areas were shown.

4. The extensive mobility of the stomach was demonstrated.

5. Study of a sign which may indicate perigastric disease was suggested.

University of California Hospital
San Francisco 22, Calif.

REFERENCES

1. SCHINDLER, R., AND TEMPLETON, F. E.: Comparison of Gastroscopic and Roentgen Findings. Radiology **29:** 472–479, October 1937.

2. TEMPLETON, F. E., AND SCHINDLER, R.: Roentgenologic and Gastroscopic Studies in Chronic Gastritis and Peptic Ulcer. Am. J. Roentgenol. **41:** 354–367, March 1939.

3. TEMPLETON, F. E., AND BOYER, R. C.: Diagnosis of Gastric Cancer: Analysis of Gastroscopic and Roentgenologic Findings. Am. J. Roentgenol **47:** 262–274, February 1942.

4. BERRIDGE, F. R.: Radiological Aspect of Gastritis. Brit. J. Radiol. **15:** 1–10, January 1942.

5. FORSSELL, G.: Mechanism of Movement of Mucous Membrane of Digestive Tract. Am. J. Roentgenol. **10:** 87–104, February 1923.

6. SCHINDLER, R.: Gastroscopic Observation Concerned with Gross Anatomy of Stomach. Am. J. Digest. Dis. & Nutrition **3:** 149–153, May 1936.

7. KADRNKA, S.: Etude des muqueuses digestives par des colloïdes opaques. Imprégnation de la muqueuse du gros intestine avec de l'umbrathor. J. de radiol. et d'électrol. **15:** 585–607, November 1931.

8. DEICHMANN, W., AND WITHERUP, S.: Observations on the Ingestion of Methyl Cellulose and Ethyl Cellulose by Rats. J. Lab. & Clin. Med. **28:** 1725–1727, November 1943.

9. MACHLE, W., HEYROTH, F. F., AND WITHERUP, S.: Fate of Methylcellulose in the Human Digestive Tract. J. Biol. Chem. **153:** 551–559, May 1944.

10. BENSAUDE, GRÉGOIRE, AND RACHET: La situation de l'estomac dans la position genu-cubitale et dans la position de lordose dorso-lombaire. Arch. d. mal. de l'app. digestif **14:** 510–519, May 1924.

11. BENSAUDE, AIMÉ, AND RACHET: L'examen radiologique de l'estomac en position genu-cubitale. Arch. d. mal. de l'app. digestif **14:** 519–522, May 1924.

12. RENSHAW, R. J. F.: Gastroscopy, in Glasser, O.: Medical Physics, Chicago, Year Book Publishers, Inc., 1944.

13. SCHINDLER, R.: Gastroscopy: Endoscopic Study of Gastric Pathology, Chicago, University of Chicago Press, 1937.

14. HUFFORD, A. R., AND STONEHOUSE, G. G.: Orientation of Gastroscope by Roentgenograms. Am J. Digest. Dis. **12:** 61–64, March 1945.

Malignant Melanoma in Infancy

Report of Three Cases[1]

PETER E. RUSSO, M.D.
Oklahoma City, Okla.

ALTHOUGH moles are frequently present at birth or become discernible shortly thereafter, malignant melanomas are rarely encountered at so early an age. Malignant tumors most frequently seen during the first five years of life are retinoblastomas, renal tumors (Wilms), and neuroblastomas of the adrenals or sympathetic nervous system, usually in the order mentioned (5). Other malignant neoplasms, including the melanomas, constitute only a small percentage of the total.

Melanomas, as indicated above, may be present at birth, or they may make their appearance at any time during life. Many are first noticed shortly after puberty. It is doubtful that a nevus first recognized later in life is of recent origin; it is probably due rather to growth of a previously quiescent lesion. Only a small percentage of melanomas ever become malignant. It is, however, a well recognized fact that this type of lesion may undergo malignant change, especially when located where it is continuously exposed to irritation or trauma. In children this predisposing factor is insignificant, and hormonal stimulation has been suggested by some authorities as playing an etiologic role.

Fig. 1. Case I. Congenital malignant melanoma.

The neval cells are melanoblastic and may or may not produce the pigment melanin. The embryological origin of these cells lies beyond the scope of this paper. They may be of neuro-tissue derivation, in which case the melanoma is superficially located, on the skin. The more deeply situated growths arise in mesoblastic connective tissue, are sarco-

[1] From the Department of Radiology, University Hospitals, Oklahoma School of Medicine, Dr. John E. Heatley, Director. Read by title at the Thirty-first Annual Meeting of the Radiological Society of North America, Chicago, Ill., Nov. 9–10, 1945.

Fig. 2. Case I: Metastases in femurs and pelvis.

matous in nature, metastasize by way of the blood stream, and are more rapidly fatal.

The three cases to be reported presented both diagnostic and therapeutic difficulties. Other points of interest will be brought up in the discussion following each case history.

CASE I: A white male infant five weeks of age was brought to us on May 31, 1944, because of numerous nodules present over its body. The mother stated that the tumors were present at birth, April 24, 1944. Since that time, several new lumps had appeared, while one or two of the others had become smaller.

Delivery had been normal. The family history was negative for tuberculosis, syphilis, and malignant neoplasms. Two other children had been normal up to the time of death by accident.

Examination revealed normal development and marked pallor of the skin. Most remarkable were the numerous masses distributed over the entire surface of the body, varying from one to several centimeters in diameter (Fig. 1). Some appeared to involve the skin, having a purplish-red color; others were more deeply situated and were covered by normal appearing skin. The consistency was rather firm, and the deeper tumors were firmly fixed to the surrounding tissues. The scrotum and prepuce were swollen and edematous, as was the left lower extremity. The lymph nodes of the left inguinal region were enlarged and were fixed to the underlying tissues.

A clinical diagnosis of malignant melanoma was made, and the child was admitted to the hospital for further studies.

Laboratory findings were as follows. *Urine:* specific gravity 1.008; cloudy, acid, with trace of albumin but no sugar. *Blood:* hemoglobin 7.5 gm.; red cells 2,160,000; white cells 15,150 (neutrophils 48 per cent—stab cells 7 per cent, juvenile forms 3 per cent—lymphocytes 45 per cent, monocytes 5 per cent); anisocytosis and poikilocytosis; 65 nucleated red cells per 100 white cells counted; Kahn test negative.

Roentgenographic examination made on the date of admission revealed destructive bony lesions involving the lateral aspects of the distal metaphyses of both femurs, with little evidence of bone reaction. Films of the chest, skull, and other bones showed no changes. In their symmetrical distribution and location, the lesions were not unlike those seen in congenital syphilis of bones. *Impression:* Osteolytic metastases (Fig. 2). Repeated roentgen study two weeks later showed similar destructive lesions involving the left radius, ulna, and ischium.

A nodule overlying the sternum was excised and examined microscopically. Dr. Béla Halpert reported it as showing "sheets and nests of cells with large vesicular, deeply stained nuclei—their cytoplasmic borders are indistinct. Some of the cell nuclei are in a state of division. The neoplastic growth invades and replaces adipose tissue." *Diagnosis:* Malignant neoplasm, probably melanoma.

The patient's general condition grew progressively worse and he died on June 15, 1944, two weeks after admission. Permission for necropsy was not granted.

Discussion: This undoubtedly is a case of a congenital malignant neoplasm, since evidence of metastasis was present at birth. We were unable to determine the exact origin of the tumor, and it is doubtful that this could have been ascertained even by a careful necropsy because of the widespread distribution of metastases at the time of death. Special attention was given to examination of the eyes to rule out retinoblastoma, since this is the most common form of malignant tumor present at birth. No intra-abdominal masses could be detected by palpation or by any other method of examination. H. G. Wells (5), in his excellent article on *Congenital Malignant*

Neoplasms, says that, "although pigmented moles are frequently present at birth, they rarely become malignant before birth or even in infancy." In his extensive review of the literature, he encountered only four such cases that he believed could be considered authentic, those of Coe, Reinmann, Dudits and Szabó, and Krompecher. In all, he found only 66 authentic and acceptable cases of congenital malignant growths, to which he added 4 of his own: 3 cases of adrenal neuroblastoma and 1 case of neuroblastoma of the sympathetic nervous system.

Of our cases, Case I is the only one in which a correct clinical diagnosis was made. The child expired on the day we had decided to see what effect, if any, stilbestrol would produce.

CASE II: An Indian girl, three years of age, had been seen on numerous occasions and treated for the past two years for upper respiratory infections and clubfoot. On her last visit to the Orthopedic Outpatient Department, April 8, 1943, a small tumor of the scalp over the right frontal area was observed. This nodule had first appeared only six weeks previously but had rapidly grown larger so that it was about the size of a small olive.

The consistency of this mass was firm but not hard and it measured approximately 2 × 2.5 cm. and was elevated about 1.5 cm. The overlying skin contained a few dilated capillaries, but no pigment. No superficial adenopathy could be detected. Clinically the nodule was thought to be a sebaceous cyst, and the child was admitted to the hospital for its excision.

Laboratory findings were as follows. *Urine:* specific gravity 1.026; no albumin or sugar. *Blood:* hemoglobin 12 gm.; red cells 3,740,000; white cells 8,100 (48 per cent neutrophils, 52 per cent lymphocytes); Kahn test negative.

The nodule was widely excised and prepared for microscopic examination. Dr. Béla Halpert reported the tissue as showing "sheets of epithelial cells with round and elongated large vesicular nuclei of almost even size, and with hardly any discernible cytoplasmic borders; little or no connective tissue stroma is seen. Some cell nuclei stain deeply and some are in a state of division. Areas of necrosis are seen here and there. There is an infiltration by these cells of the fibrous connective tissue. About these areas are large mononuclear cells with golden yellow granules in their cytoplasm." *Diagnosis:* Neoplasm, probably malignant, probably epithelial.

X-ray films of the skull and chest taken at this time were reported as showing no evidence of any pathologic change.

Fig. 3. Case II: Metastases in 9th thoracic vertebra, with soft-tissue paravertebral shadow.

The patient was discharged only to be readmitted on Aug. 17, 1943, four months later, suffering from an attack of acute tonsillitis. Enlarged lymph nodes present at both angles of the jaw were thought to be due to the throat infection. The patient was again discharged after a few days, apparently in good condition. When seen again, one month later, she had a stiff neck and paralysis of both lower extremities, incontinence of feces and urine, and exophthalmos of the left eye. Because of the severe poliomyelitis epidemic, that disease was suspected. On more thorough examination, it was found that the nodes on the right side of the neck were enlarged, firm, and fixed. Films of the skeleton revealed destructive lesions involving the 5th lumbar vertebra and left sacroiliac joint, the sacrum, both iliac bones, the upper ends of the femurs, and the 9th dorsal vertebra (Figs. 3 and 4). Chest films were negative for pulmonary metastases.

The child died Sept. 11, 1943, less than six months after the onset of the disease.

Necropsy revealed gross metastases to the lungs, kidneys, liver, pancreas, suprarenals, thymus, abdominal lymph nodes, spine, and skull. *Final Diagnosis:* Malignant melanoma.

Discussion: In this case a malignant growth was not suspected until microscopic examination of the tissues was done. In spite of early excision of the mass, only six weeks after the period of onset, metastasis had already taken place. Careful

and repeated examinations of the eyes failed to reveal any evidence that the original site of the tumor was intra-orbital. Dargeon (1) states that pigmented malignant melanomas in early life are usually slow-growing tumors and metastasis occurs late. The non-pigmented malignant nevus, however, is usually fast-growing and runs a rapid course. From these cases it appears that these tumors conform to their behavior when occurring later in life, in that they vary in rate of growth and degree of malignancy.

Fig. 4. Case II: Metastases in pelvic bones.

CASE III: A 3-year-old colored girl was first seen on Dec. 3, 1941, for a skin lesion of the left knee. The mother informed us that a small nodule first became noticeable about one year earlier and had caused no concern until about a month ago, when it began to grow larger and bled on several occasions. When first seen by us, the lesion was about 2 cm. in diameter and elevated over 1 cm. It was located on the lateral aspect of the left knee. The skin over this area was ulcerated and its surface was covered with a grayish exudate. The consistency of the mass was rather soft and no enlarged nodes were palpable in the left inguinal region. The general condition was good. A clinical diagnosis of granuloma pyogenicum was made and the patient was admitted to the hospital for treatment.

Laboratory findings were as follows. *Urine:* Specific gravity 1.020; no albumin or sugar. *Blood:* hemoglobin 73 per cent; red cells 3,870,000; white cells 4,500 (neutrophils 52 per cent, lymphocytes 47 per cent); sedimentation rate 92 per cent (Westergren); Kahn test negative.

The lesion was widely excised and the skin edges were closely approximated and sutured. The wound became infected, however, and it was then noticed that a lymph node in the left inguinal region had become swollen.

Tissue specimens were examined by Dr. Hugh Jeter, who reported them as showing "pigmented skin with a comparatively large ulcerated area. At the margin of the ulcer and in the base of the ulcer, there are streams, masses, cords and irregular groups of poorly differentiated cells, some definitely in contiguity with the basement cells of the epidermis. Portions are moderately vascular. Stroma is scanty. Unable to definitely identify melanotic pigment."

Diagnosis: (1) Malignant tumor, probably amelanotic melanoma; (2) ulcerative inflammation.

Since we were unable to determine definitely whether the enlarged inguinal node was of an inflammatory or malignant nature, it was decided to give a very moderate amount of deep x-ray therapy; 1,200 r in air (170 kv., 20 ma., 50 cm. distance

Thoraeus filter) were given in daily doses of 200 r. With healing of the incision, the patient was discharged from the hospital. She was not seen again until March 4, 1942, about three months later. Although the primary site of the lesion had completely healed, the lymph node in the inguinal area had enlarged to twice its previous size. The involved lymph node was removed, and ligation and section of the left saphenous vein were performed. Microscopic examination of the tissue showed invasion and replacement with tumor cells resembling those described as occurring in the original lesion. Additional deep x-ray therapy over the left inguinal area was given, similar in amount to the previous series. This patient has been closely followed for over three years and careful physical and radiographic examinations have failed to show any evidence of recurrence or metastases.

Discussion: In this case as in the previous one, a malignant lesion was not suspected until microscopic examination was done. In contrast to Case II, the nodule of the skin had been present for over one year and had grown to five times its original size in the last month. A metastatic node was permitted to remain unmolested for three months because the mother was satisfied with the appearance of the original site of the lesion. Surely this must have been a very slow-growing type of non-pigmented malignant melanoma. It will be interesting to follow this case further to see what the final outcome will be. In none of the cases recorded here were we able to obtain a history of malignant neoplasms in the family, although the second patient came from an orphanage and no family history was available. The last case has an added interest in that it occurred in a colored patient, since this type of malignant neoplasm is seldom found in the American Negro.

COMMENTS

Malignant melanomas are rarely encountered in the first five years of life and are very rarely seen as congenital lesions. Kellert in a series of 15 malignant tumors in children (2), and Scotti (4) in 64 cases, found not a single instance of malignant melanoma. Ritvo's series (3) of 72 cases included 2 examples, in girls 14 and 11 years of age, respectively. Our experience of seeing three cases within a short period of time, all in very young children, is unusual.

In our second case, a pigmented malignant melanoma, though discovered and treated early, ran a rapid fatal course. In the third case, a non-pigmented malignant melanoma has shown all the characteristics of a slow-growing, late-metastasizing growth, and the patient after five years is without evidence of any recurrence or metastases.

Since the final diagnosis eventually must be made on the microscopic examination of the tissue removed, all suspicious appearing lesions should be treated by wide excision.

SUMMARY

Three cases of malignant melanoma are reported: one congenital and the other two occurring early in life.

Microscopic examination of the lesion was necessary in two cases to reveal the true nature of the disease. In one case, the diagnosis was made clinically and confirmed by biopsy.

A non-pigmented malignant melanoma, occurring in a colored child, shows no evidence of recurrence or metastasis five years after excision of the primary tumor and a single metastatic lymph node, with subsequent deep x-ray therapy.

230 Osler Building
Oklahoma City 4, Okla.

REFERENCES

1. DARGEON, H. W. (editor): Cancer in Childhood and a Discussion of Certain Benign Tumors. St. Louis, Mo., C. V. Mosby Co., 1940.
2. KELLERT, E.: Malignant Tumors in Children. New York State J. Med. **39:** 2259–2266, Dec. 15, 1939.
3. RITVO, M., HOUGHTON, J. D., AND MCDONALD, E. J.: Cancer in Childhood. Radiology **39:** 278–282, September 1942.
4. SCOTTI, D. W.: Malignancies in Infancy and Childhood: Clinical and Radiological Survey of 64 Consecutive Cases. New York State J. Med. **39:** 1188–1208, June 15, 1939.
5. WELLS, H. G.: Occurrence and Significance of Congenital Malignant Neoplasms. Arch. Path. **30:** 535–601, August 1940.

The "Last-Straw" Factor in Low Back Disability[1]

With Summary of 100 Cases Examined and Evaluated by the Medical Advisory Board of the Industrial Commission of Arizona, 1934–1943

W. WARNER WATKINS, M.D.

Phoenix, Ariz.

IN A PERIOD OF nine years, 1934–1943, the Medical Advisory Board of the Industrial Commission of Arizona examined over 600 patients, among whom were 106 with disability of the low back as the chief or only complaint. This period has been chosen for the present report because during these years the writer served on the Board as consulting radiologist and secretary. In the latter capacity, it was his duty to record the historical data, the patient's complaints, the physical, clinical, laboratory, and x-ray findings, and the final conclusions of the Board for each case.

For this paper, the records of all patients with lower back disability have been reviewed. After excluding 6 cases showing fracture, neoplasm, or destructive bone disease, there remain 100 as a basis for the comments and conclusions to be presented. These 100 patients have been classified as follows, on the basis of the roentgen findings.

No visible bone injury or abnormal joint condition	42
Visible bone or joint changes	33
Developmental anomalies, with or without bone changes	25

The 42 cases without visible changes in bones or joints were evaluated as follows:

No symptoms from injury or symptoms ended	25	(59.5%)
Hysteria, neurosis, or malingering	4	
Evidence of disability	14*	
Rated at 5% general disability	4	
Rated at 10% general disability	5	
Rated at 15% general disability	1	
Rated at 25% general disability	1	
Rated at 30% general disability	1	
Total disability	2*	

* One of these was in the hysteria group.

While the cases without visible bone or joint changes are not being discussed in this paper, it is significant that the percentage of this group presenting symptoms which in the final evaluation by the Board were regarded as not attributable to the injury (59.5 per cent) approximates closely the percentage (57 per cent) classified by Johnstone (1), in a study of 3,000 cases of lower back "sprain", as not due to injury or not arising out of employment.

Here we are concerned chiefly with those cases in which there were demonstrable bone or joint conditions of an abnormal or anomalous character. There were 58 of these. Thirty-three of the patients showed arthritis of some type, of varying degree, with evaluation by the Board as follows:

No disability from injury in question	15
Evidence of disability from injury in question.	18
5% general disability	4
10% general disability	10
15% general disability	1
20% general disability	1
50% general disability	2

Of the remaining 25 patients, showing developmental anomalies in the lower back, practically all had an associated osteoarthritis. Evaluation in this group was as follows:

No disability from injury in question	11
Disability from injury in question	14
5% general disability (or less)	2
10% general disability	5
15% general disability	2
20% general disability	3
35% general disability	1
65% general disability	1

There was no question in the estimation of the Board that in the 58 patients with abnormal bone or joint conditions painful

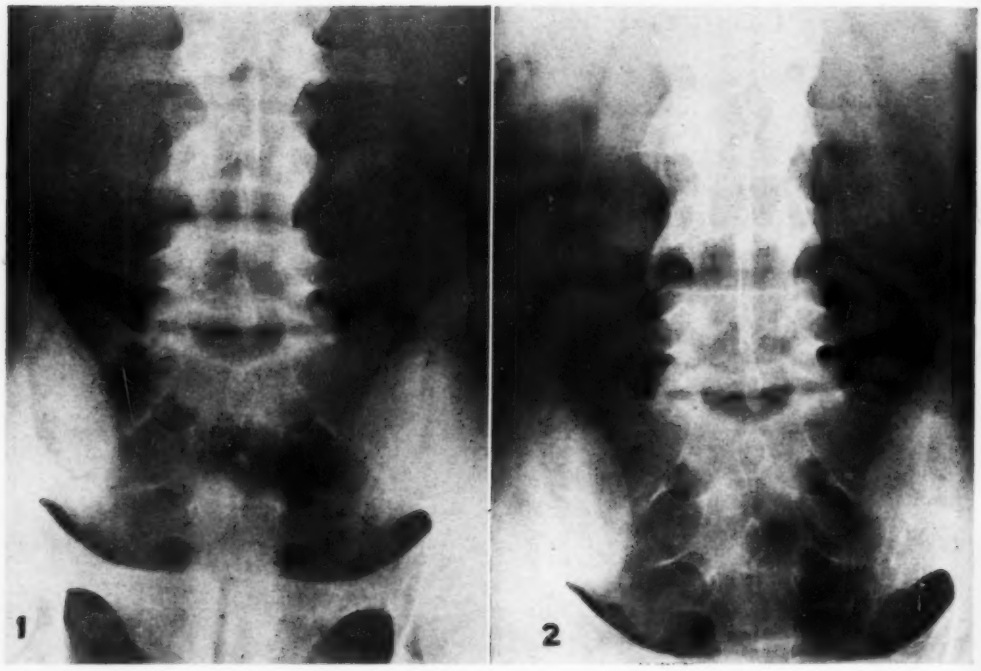
[1] Read by title at the Thirty-first Annual Meeting of the Radiological Society of North America, Chicago, Ill., Nov. 9–10, 1945.

symptoms developed during employment, but in 26, or nearly half the group, the decision was that the disabling symptoms could not be attributed to injury. It is in defense of these conclusions by the Medical Advisory Board, and of similar decisions by individual consultants and other consulting boards, that this paper is presented. The need for such a rationalization may be judged from the fact that one of these patients brought suit against the Medical Advisory Board, the charge being fraud for knowingly making a decision of "no disability from the injury in question" when it must have been known there was disability from the injury. A jury verdict of $6,000.00 was obtained against the Board but was later reversed by the Supreme Court of the state.

The rationale of the Board's decisions in many of these difficult cases rests on the broad and sound biologic principle of adaptation, which is one of the fundamental life properties and perhaps the underlying principle of all life activity. Adaptation enables the cell or organism to survive unfavorable conditions and, therefore, underlies most medical practice. In clinical medicine we attempt to change unfavorable conditions and thus enable the organism to survive a danger, but most of our medication aims to lend aid to the adaptive or compensatory powers of the body. In many of our most serious diseases all that the clinician can hope to do is to assist the organism to adapt itself to the presence of a pathological process and live with it, and in spite of it, as long as possible.

The adaptive processes themselves may under certain conditions become disabling, as when external stresses are too suddenly applied, as in the nervous collapse of overwork or too rapid military training. Industry also has its casualties of this type, and these have been greatly multiplied by the necessity for using thousands of people in tasks for which they have not had adaptive training of muscles or joints. When adaptive changes take place in some vital structure or tissue, general damage may result; a good example is that form of malignant hypertension due to constriction of the renal arteries, where a high blood pressure needs to be maintained in the whole arterial circulation in order to push the blood through the narrowed renal vessels.

The effort at adaptation may be at the expense of other tissues or organs, as in the halisteresis found in many conditions. The generalized decalcification of senescence is common, and many cases of disability are being seen due to the war-time necessity for older people to engage in occupations which required unaccustomed stresses on the bony framework. Most of the tissue changes of senescence are adaptive in character and, under normal conditions, the habits of life can be so adjusted that they take place gradually and health is maintained. The senescent decalcification of the vertebral bodies, found normally after middle life, may furnish a good example of a "last-straw" factor breaking an adaptive process. The lateral view of a senescent spine will show evidences of adaptive change: The vertebral bodies will have a "washed-out" or low-density appearance, due to loss of calcium; there will be a compensatory expansion of the disk cartilages; the cortices of the bone adjacent to the disks will retain calcium or new calcium will be deposited; in the longitudinal or lateral ligaments, or at their attachments to the vertebrae, compensatory hypertrophic spurs may develop. All of these changes are but the effort of the organism to compensate for the loss of support brought about by the calcium removal. If, in such cases, the process of adaptation does not keep pace with the demands thrown on the spine, the time often comes when a last straw of stress may literally "break the camel's back." Spontaneous collapse of vertebrae is often observed in the senescent spine attributable solely to this last straw. Practically all of the changes in chronic hypertrophic arthritis of the spine and those observed in connection with developmental anomalies at the lumbosacral area are adaptive in character, and in



Figs. 1 and 2. Case III: Infectious arthritis of the sacroiliac joints. Claim of low back pain due to trauma. Ruled not compensable. Fig. 1 is a reproduction of a film made Feb. 11, 1937. Fig. 2, Jan. 10, 1939, shows further extension of the infectious arthritis nearly two years later. See also Fig. 3.

them the last-straw factor plays an important part in the development of symptoms.

In order to give intelligent consideration to the abnormal bone and joint changes found in the lower back, with or without associated developmental anomalies, it is necessary to resolve the confusion that exists with regard to arthritis, using the term in a very general sense, as it concerns the lower back. Up to the present, probably the most authoritative classification of arthritis is that of the American Rheumatism Association. In their first annual review, in 1935 (2), the Committee on the Control of Rheumatism set up a classification which has been only slightly modified since. The classification officially adopted by the Association, as given in the most recent review (3), groups all forms of rheumatism and arthritis under nine headings:

1. Specific infectious arthritis (organism known).
2. Arthritis of rheumatic fever.
3. Arthritis of immediate traumatic origin.
4. Rheumatoid arthritis (synonyms: atrophic arthritis, proliferative arthritis; chronic non-specific infectious arthritis, Still's disease, Marie-Strümpell spondylitis).
5. Osteo-arthritis (synonyms: chronic hypertrophic arthritis, senescent arthritis, degenerative joint disease).
6. Arthritis of gout.
7. Arthritis of neuropathic origin (Charcot joint).
8. Neoplasms of the joint.
9. Miscellaneous forms (or arthritis associated with other diseases).

From this classification, it will be seen that the chronic bone or joint changes found in the lower spine will fall into one or another of three groups.

I. Chronic bone changes from some specific infection, as tuberculosis, typhoid fever, undulant fever, fungus infection, or pyogenic infection, or from a benign or malignant neoplasm.

II. Rheumatoid arthritis, known also as chronic infectious arthritis, atrophic arthritis, chronic proliferative arthritis, Marie-

Strümpell spondylitis (or spondylarthritis), spondylitis ankylopoietica or ankylosing arthritis, Still's disease, Bechterew's spondylitis or arthritis, spondylitis rhizomelica, arthritis deformans.

III. Osteo-arthritis, known also as hypertrophic spondylitis or arthritis, degenerative arthritis, senescent (or senile) arthritis, spondylosis, osteo-arthrosis.

One point of confusion, which deserves special emphasis, is the uncritical use of the terms "proliferative" and "hypertrophic" in the medical literature. The Rheumatism Association's committee stresses the point that the designation "proliferative" should never be used in reference to bone, but always to soft tissues, as synovia, the joint capsule, and ligaments. On the other hand, "hypertrophic" should always refer to bone and never to soft tissues. From the roentgenologic point of view, the most striking difference between Groups II and III is that in rheumatoid arthritis symptoms always precede the development of changes demonstrable on the film, while in osteo-arthritis well developed bone lesions are always apparent before symptoms arise.

Of the 33 patients showing arthritis to a visible degree in the lumbosacral or sacroiliac joints, 5 were classified as having rheumatoid arthritis and 28 as having osteo-arthritis. There were 15 cases in which the Board did not relate the symptoms complained of to injury, either as a causative or aggravational factor. Three of these cases were in the infectious or rheumatoid group. These 3 patients showed variable clinical manifestations.

CASE I: Mrs. M. R., a janitress, aged 48, was moving a desk in order to mop the floor. As she was pushing the desk, in a half-stooped position, she felt pain in the lower back. She finished her duties that night, but the next day her back was stiff and she did not return to work but consulted an osteopath. She soon became bedfast from pain, insomnia, weakness, and loss of appetite. X-ray examination showed a hypertrophic spur on the fourth lumbar vertebra as the only visible bone change. Eight months later, re-examination revealed visible increase in the size and density of the spur, raising the question of possible traumatic reaction in the spur.

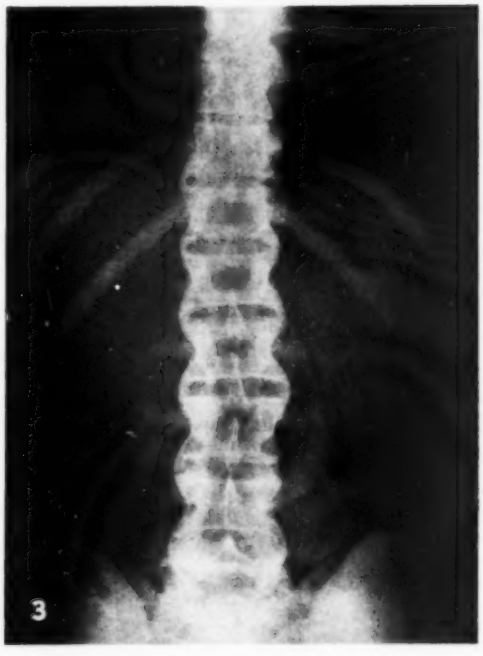


Fig. 3. Case III: Typical bamboo spine. Film made March 25, 1941, four years after Fig. 1.

CASE II: A workman complained of low back pain, which he claimed was due to his employment. Since no accident could be established, and x-ray examination showed definite sacroiliac changes of infectious arthritis, the Board's decision was that the pain and disability could be fully explained on the basis of the arthritis.

CASE III: This patient was so persistent in his claims of disability due to injury that he was repeatedly examined by x-ray over a period of five years. The development of Marie-Strümpell arthritis was beautifully shown from the stage of sacroiliac involvement a complete bamboo spine (Figs. 1, 2, and 3).

Whenever a workman presents himself for examination or treatment of a low back sprain, with the statement that he has never before suffered pain or disability in his back, and the x-ray films show the bone and joint changes of well established rheumatoid arthritis, the examiner is justified in doubting the patient's truthfulness, since pain practically always precedes the development of visible bone changes. One patient with a completely ankylosed bamboo spine first made this claim but later admitted that he had suffered with stiff-

Figs. 4 and 5. Case IV: Chronic osteo-arthritis with osteosclerosis in the lumbosacral area. The lateral view (Fig. 5) shows thinning of the disk, which was accompanied by vertical offset in the apophyseal facets, shown best in an oblique view.

Figs. 6 and 7. Case V: Extensive lumbosacral osteo-arthritis. The lateral view (Fig. 7) shows thinning of the disk and hypertrophic spurs on the lumbar vertebrae.

ness and pain in the back throughout his youth and that his back "gradually got stiff." He is not included in this report since he had a fracture of the twelfth dorsal vertebra. Another patient—one of the 5 mentioned above—persisted in denying previous back trouble, overlooking the fact that one of the Board members had been consulted by him about a year previously for pain in the lower back not associated with injury.

In osteo-arthritis the hypertrophic bone changes precede the development of symptoms. Very frequently these hypertrophic spurs and bridges may reach astonishingly large proportions without producing sufficient disability to cause the patient to discontinue work, because the adaptive adjustments keep pace with the stresses thrown on the spine. However, the margin of safety is always reduced, and a last-straw factor may break the compensation at any stage in the development of the osteo-arthritic picture.

CASE IV: C. V. S., a 40-year-old mechanic, was fitting a wheel on a car (Aug. 23, 1940), being seated with the legs spread. The wheel slipped and jerked him forward, causing pain in the back, which had persisted. Examinations on Feb. 3, March 3, and May 26, 1941, showed rather extensive changes in the lumbosacral area, with thinned disk, osteosclerosis, hypertrophic spurs, and other evidence of a slowly developing osteo-arthritis (Figs. 4 and 5).

Sooner or later such changes will bring on pain and disability, regardless of any back sprain. An entirely normal motion or stress no greater than has been sustained many times before may become a last-straw factor, and pain begins. In the apophyseal joints, the reparative reaction may fail to keep pace with the cartilage erosion, bone becomes exposed, and pain is initiated. The thinning disk cartilage may eventually so narrow the intervertebral channels for the nerve trunks that these will be pinched or offset the articular facets, as emphasized by Williams (4). Pain will lead to muscle spasm, which will still further narrow the nerve pathways or bring the articular facets more forcibly into contact; more pain will result, which will cause more muscle spasm, and a vicious circle will be established.

The following case illustrates a similar but more advanced degree of bone change.

CASE V: T. M., a 62-year-old man, was lifting pieces of meat from a truck and hanging them on a rail in a packing house. He claimed that one foot slipped as he rotated his back in lifting a piece of beef from truck to rail and that simultaneously he felt a sharp pain in his back. He did not fall, and the slipping of the foot was nothing unusual. No proof of an accident could be established. The x-ray findings (Figs. 6 and 7) were those of extensive hypertrophic spondylitis and arthritis.

The only unusual feature in this man's routine was that he began to feel pain while carrying on his usual duties. He finished his work for the day and then laid off because of persistence of the back pain. When he was examined by the Board, several months later, they were so impressed by the changes in the spine that they gave the somewhat equivocal opinion that "if this man had an accident" (which suddenly strained his back), he probably suffered an aggravation of the pre-existing osteo-arthritis to the extent of a 10 per cent general disability.

This and similar cases bring up an important question which this paper intends to discuss, and which the Advisory Board did not always try to answer: *When a man has a slowly developing arthritis of the spine which is being compensated for by adaptive changes in structure and mechanics, so that his working ability is not materially reduced, and some last-straw factor which would not cripple a normal back breaks this compensatory adaptation and results in disability, to what extent shall the disability be chargeable to the accident?*

CASE VI: W. J., a 62-year-old miner, while stooping, was struck in the lumbar area, on March 8, 1942, by a fall of dirt and rock. He claimed that he had been knocked down and had to be carried from the mine. A roentgenogram (Fig. 8) showed extensive osteo-arthritis and possibly a complicating infectious arthritis. On Aug. 31, 1942, he still claimed total loss of functional use of the back to a degree that the usual orthopedic examinations could not be carried out.

This workman claimed never to have suffered disability in the back prior to the

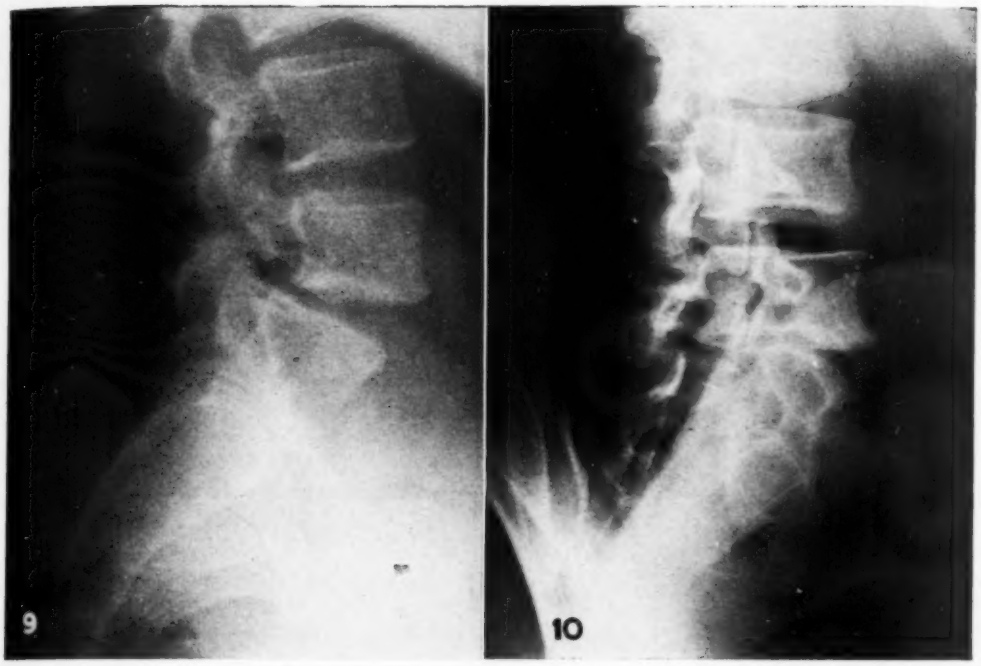
Fig. 8. Case VI: Film made on day of injury, showing extensive osteo-arthritis in entire lumbar area, claimed to be symptomless up to time of accident.

accident and to be completely disabled afterwards. His disability was not questioned, but the Board's final decision was that he had enough arthritis to disable him and that only a small percentage of his continuing disability could rightly be charged to aggravation from injury. The final rating was a 10 per cent permanent general disability as the result of the accident.

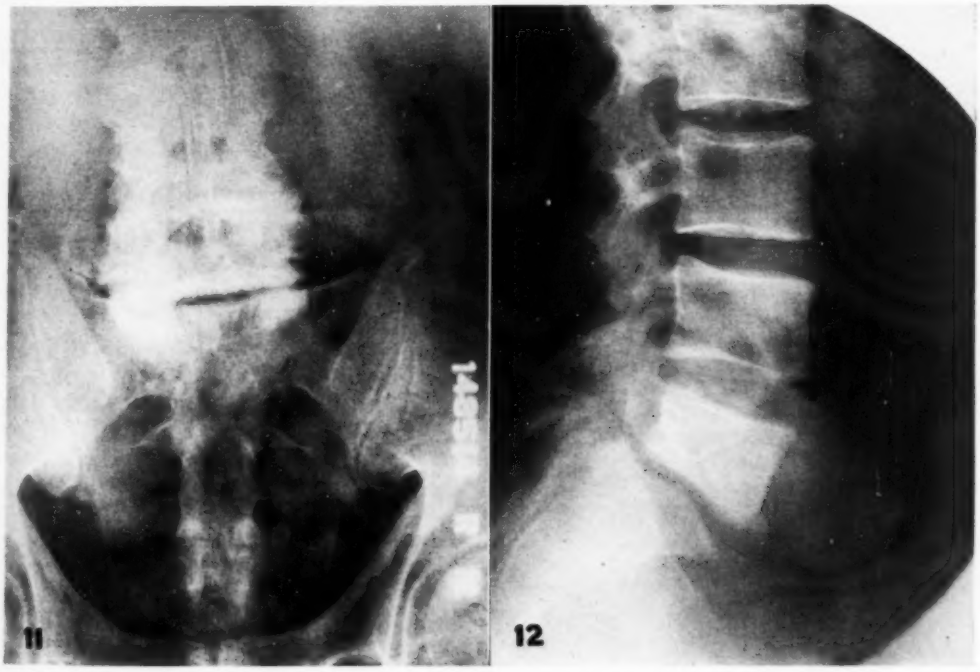
Of the 25 patients with developmental anomalies, 10 were found to have a defective fifth lumbar arch, with actual or potential spondylolisthesis. This anomaly is an excellent example of a condition in which a variation from normal makes demands on the bony mechanism and other supporting structures which must be met by adaptive adjustments and protective reactions in bones and joints. The defective arch is present from birth, but only when the bones are fully developed and begin to meet the demands of an adult functioning back do the protective changes begin to show. Very seldom is the body of the fifth lumbar shifted forward by a single trauma. In all the cases of this group, and in many others observed, where a forward shift of the vertebral body was found, hypertrophic changes indicating an old condition were present, pointing to a gradual development. Over a considerable period of time, the compensatory (adaptive) changes may be sufficient to protect the back and prevent the development of crippling symptoms, although many of these patients will give a history of vague discomfort or repeated disability from trivial causes. Eventually some accident or strain which would not cripple a normal back becomes the last-straw factor, the vertebral body tries to slip further forward, strain is thrown on ligaments and joint structures, and disabling pain is felt. X-ray examination leads to the discovery of the anomalous condition. These are difficult cases to evaluate. Four of the ten patients with defective fifth lumbar arches had fusion operations. In three of these the final rating was a 10 per cent general disability, which is considered a very good result; the fourth case was finally rated at 25 per cent general disability.

One patient with spondylolisthesis was given a 25 per cent general disability rating and, after a second accident, was found to have an additional 10 per cent disability, making a final rating of 35 per cent. In one case the rating was 35 per cent general disability as regards a functioning back, but the Board qualified this with the opinion that 20 per cent of this disability existed prior to the accident and only 15 per cent could rightly be ascribed to the injury in question. Two cases of spondylolisthesis call for special report—one in which 65 per cent general disability was allowed and one in which no disability was attributed to the alleged accident.

CASE VII: F. B. was injured on Oct. 3, 1938, by turning his foot on a rock and straining his back. He claimed disability chiefly in the form of lower back weakness and inability to bend forward and lift a weight. On physical examination all back motions were found to be normal. X-ray examina-



Figs. 9 and 10. Case VII: Beginning spondylolisthesis with slight bone reaction. The oblique view (Fig. 10) shows a defect at the pars interarticularis. The defect was bilateral.



Figs. 11 and 12. Case VIII: Spondylolisthesis with extensive osteosclerotic changes. Fig. 12 shows the offset of the fifth lumbar vertebrae, with disk degeneration and thinning. The non-fusion of the pars interarticularis was bilateral.

Fig. 13. Case IX: Disk extrusion at the fourth lumbar space, left side.

tion showed a bilateral defect in the fifth lumbar arch and beginning spondylolisthesis (Figs. 9 and 10). The Board's final conclusion was that no disability existed which could not be explained on the basis of the anomaly alone.

CASE VIII: H. J. M. on Jan. 12, 1938, fell head first into a tank at a brewery. The clinical symptoms suggested disk extrusion. The x-ray films showed a defective fifth lumbar arch and beginning spondylolisthesis (Figs. 11 and 12). The lumbosacral changes were somewhat greater than in Case VII and the clinical evidences of disability more pronounced.

The Board rated the disability at 65 per cent. They recommended appropriate surgery, either for disk extrusion if visualization of the canal demonstrated this, or, if not, fixation surgery to the lower spine. The patient refused oleomyelography, and surgery was not done. Spontaneous improvement took place, so that a later Board rated the disability at 20 per cent general.

Only one oleomyelographic examination was made on this group of patients. Suspected or known disk extrusion or nucleus herniation cases were usually diagnosed and treated by individual surgeons without need for consultation with the Board; also, in the period covered by this report, the opaque oils available were not popular for the group of patients in question. Since the advent of pantopaque, myelographic studies are being made with much greater frequency. The one case examined by the Board (Case IX) is shown in Figure 13, with a defect in the oil column at the fourth lumbar disk.

After compensation or adaptation in the lower back has been broken by a last-straw strain, restoration of compensation is a long and tedious process. If one thing more than another has been impressive in the cases of low back disability studied by this Board, it is the absolute necessity for an intelligently directed and carefully supervised re-establishment of adaptive compensation or the rehabilitation of the worker. The regime aiming at recovery from a low back disability should be as closely supervised and meticulously directed as the "come back" of a patient with a healing cardiac occlusion, or a patient with healing tuberculosis of the lungs. Rehabilitation of the lower back, so that adaptation and compensation are restored, requires time, patience, close supervision, and the intelligent graduation of selected exercises. No careless instruction to "go out and do light work" or "take setting-up exercises" will meet the requirements. The come-back road in low back disability, like the "strait" road of Scripture, is difficult, but success lies at the end. The broad and easy way leads only to failure and disappointment.

507 Professional Building
Phoenix, Ariz.

REFERENCES

1. JOHNSTONE, R. T.: The Industrial Back from the Internist's Viewpoint. Am. J. Surg. **48:** 544–547, June 1940.

2. HENCH, P. S., ET AL.: Present Status of Problem of Rheumatism: Review of Recent American and English Literature on "Rheumatism" and Arthritis. Ann. Int. Med. **8:** 1315, April 1935.

3. HENCH, P. S., ET AL.: Rheumatism and Arthritis: Review of American and English Literature for 1940. Ann. Int. Med. **15:** 1002–1108, 1941.

4. WILLIAMS, P. C.: Low Back Pain. South. M. J. **33:** 788–797, August 1940.

Diffuse Calcification of the Pancreas[1]

ARTHUR J. PRESENT, M.D., and MILTON J. GEYMAN, M.D.
Santa Barbara, Calif.

THE LITERATURE contains only seventeen cases of pancreatic calcification other than stones. The infrequent mention of this condition in radiologic journals would indicate the desirability of individual case reports. In our first case the condition was proved by surgery. The second case is included because of the typical roentgen findings.

Figs. 1 and 2. Case 1: Calcification in the pancreatic bed. Fig. 2 (right) shows the calcification as it appeared in a gallbladder film.

CASE 1: A white male, 23 years of age, a sprayer in a lemon orchard, had been in good health until three years earlier. At that time he was in bed for seven days, complaining of epigastric pain, diarrhea, and some fever. After recovery from this acute onset, there was a recurrence of the epigastric pain every four to six weeks, with nausea and vomiting, usually lasting for five to seven days. In the past year the attacks had been more frequent. In 1942 a roentgen examination at a veterans' hospital showed a duodenal ulcer. A later roentgen study elsewhere was negative. During the two weeks preceding admission, cramping epigastric pain had been present. Some pain was referred to the left shoulder.

Roentgen study, Aug. 15, 1944, showed an irritable duodenal bulb, a small bowel deficiency pattern, and a 60 per cent four-hour gastric retention. The findings were interpreted as being due to duodenal ulcer. The pain improved on an ulcer regime and the patient was well for some months. He was readmitted to the hospital Dec. 8, 1944, complaining of sharp pain in the left abdomen.

Physical examination showed spasm over the entire left abdomen, more marked in the left upper quadrant. Laboratory findings were negative except that the urine contained acetone 4+ and diacetic acid 2+.

Roentgenograms of the abdomen showed absence of free air. The prone film (Fig. 1) revealed an

[1] Read by title at the Thirty-first Annual Meeting of the Radiological Society of North America, Chicago, Ill., Nov. 9–10, 1945.

Fig. 3. Case 1: Intravenous pyelogram, showing normal renal structures.

"increase in density of the abdomen with etching of the loops of the gas-filled colon as evidence of fluid. Throughout the bed of the pancreas there are multiple calcium shadows, indicating calcification within that organ. These shadows were present in the barium studies of Aug. 15, 1944, and while obscured by the barium meal, they were well shown in the five-hour film."

Intravenous pyelography showed normal renal structures; gallbladder function was shown by oral cholecystography to be normal and there were no biliary concretions (Figs. 2 and 3).

Surgical removal of the distal two thirds of the pancreas, leaving the head, was accomplished and no diabetic signs have been noted. The decalcified specimen revealed only a few patches of normal pancreatic tissue. There was almost complete replacement by dense hyaline connective tissue containing numerous cysts and minute abcesses.

CASE 2: A 55-year old white male complained of vague epigastric pain which had been present for years, but not severe enough for hospitalization. A chronic productive cough was explained by roentgen studies with opaque oil as being due to bronchiectasis.

Gastro-intestinal roentgen studies showed no lesions in the stomach, duodenum, or colon. Opacities of calcium density, measuring 1 to 6 mm., were present in the pancreatic area. None of these showed lamination and their shape was irregular. Their distribution was more marked within the loop of the duodenum (Figs. 4 and 5).

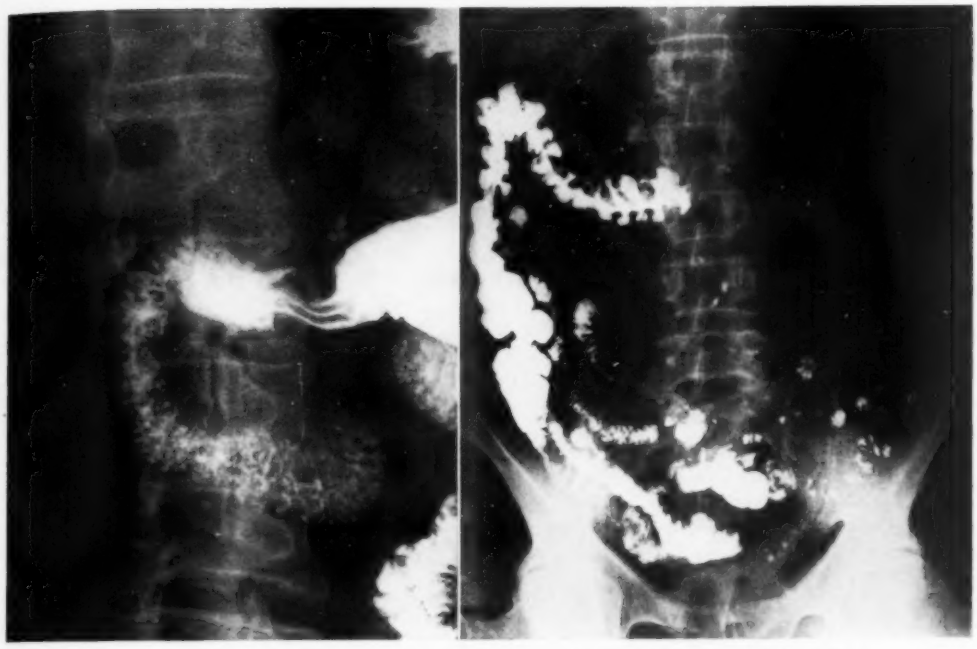
Five years earlier the patient had been hospitalized for chronic alcoholism. Because of vague pain in the lower right abdomen, a roentgenogram was made of the urinary tract. Opacities in the upper abdomen were regarded as opaque material in the stomach (Fig. 6). The patient did not complain of epigastric pain at the time. Laboratory findings were negative. There was no indication of diabetes.

DISCUSSION

The symptoms of pancreatic lithiasis and pancreatic calculi would seem to be quite similar. As in the cases reported here, the pain is recurrent, severe, and may be referred to the back. Snell and Comfort (1) summarized the findings in 18 cases of pancreatic lithiasis as follows: 11 had colic, 8 motor disturbances of the stomach and small intestine; 8 showed signs of diabetes, either actual or latent; 6 showed weight loss, 8 diarrhea, 4 hepatic enlargement; 1 had ascites with edema and jaundice, and 2 had complicating infection. Several of these findings were present in the cases reported here. The irritability of the duodenal bulb in Case 1 may well have been the result of pancreatic irritation, and the small intestinal pattern suggests the same causative agent.

As a result of their observations, Snell and Comfort felt that roentgenograms of the pancreatic area should be made in patients who "present (1) obscure attacks of abdominal pain or gastro-intestinal storms of uncertain origin, (2) diarrhea with fatty stools, (3) unexplained enlargement of the liver with or without ascites, (4) diabetes, particularly when associated with such abdominal symptoms as colic or diarrhea, (5) jaundice of indeterminate nature."

Although much has been written on the subject of pancreatic calculi, there is relatively little to be found in the literature on diffuse calcification of the pancreas. Jaleski (2) found 220 cases of calculi reported prior to 1942, while Beling (3), in 1940, could collect but 12 instances of disseminated calcification. To this he added a thirteenth. In a subsequent summary, Beling, Baker and Marquis (4) again mentioned the rarity of the condition as they reported another case. King and Waghelstein (5) commented on the infrequency of pancreatic calcification as a pathologic entity and on the even more unusual clinical diagnosis. Reviewing the report of Beling, they disagreed with his inclusion



Figs. 4 and 5. Case 2: Gastro-intestinal studies. Fig. 5 (right) is the four-hour film.

of two questionable cases. By adding 4 of their own, they considered the total assured cases to number 15. They pointed out that these 15 cases of actual calcification of the gland were but 7.1 per cent of the 209 cases recorded with a diagnosis of pancreatic lithiasis. Darling (6) has recently published a single case, the only additional report in the available literature. Thus it would seem that, with the cases reported herein, there are some 19 recorded examples of diffuse pancreatic calcification in the literature to date.

Beling, Baker and Marquis (4) felt that calcification followed repeated attacks of pancreatitis. They found the average age to be around forty years, although the condition has been noted at all ages. It is predominantly a disease of males. Pasternack (7) stated that parenchymal calcification is a sequel of infection, inflammation and necrosis, citing the report of Edmondson and Fields (8) as evidence. Although the rate of production of radiographically visible calcification is not known, King and Waghelstein believed that it could be relatively rapid. In one case of their series of four, a marked increase in calcification was noted on films taken at an

Fig. 6. Case 2. Abdominal film made five years before those in Figs. 4 and 5.

interval of eighteen months. Interestingly, there had been no symptoms of an inflammatory process during that time.

All writers stress the roentgen demonstration as the only approach to a clinical diagnosis. Beling, Baker, and Marquis urged the routine examination of the abdomen in the presence of any type of abdominal complaint, particularly if there is recurrent pain. They felt that a preliminary flat plate is most important, since dye or barium may obscure the fine calcium shadows. Localization of the shadows may be clarified by the use of gas, air, or barium in the stomach, with films in lateral and oblique positions as well as in the anteroposterior and postero-anterior projections.

The differential roentgen diagnosis should not be difficult. Diffuse pancreatic calcification characteristically outlines the gland in its usual position. A fine trabeculation throughout the bed of the pancreas, extending from the loop of the duodenum to the tip of the spleen, should not be confused with other upper abdominal calcification. Pancreatic calculi are larger and are usually confined to the head of the gland. Biliary and urinary calculi, calcified nodes, calcification in the costal cartilages and in the liver and spleen, are distinguishable either directly or by supplementary studies with selected dyes. Adrenal calcification may conceivably be confused, but this tends to be quite discrete and should be recognized by its relationship to the renal shadow. If doubt still remains, the use of the methods advocated by Beling, Baker, and Marquis will certainly be conclusive. The rarity of the condition makes its clear demonstration most desirable and warrants a careful radiographic examination.

SUMMARY

Two cases, one proved at operation and one having the roentgen criteria of disseminated pancreatic calcification, are reported. The rarity of the condition is obvious from the paucity of reports in the literature. It is quite probable, however, that its occurrence is more frequent than the published reports would indicate and the diagnosis should certainly be sought in all cases of obscure recurrent abdominal pain.

23 E. Ochoa St.
Tucson, Ariz.

REFERENCES

1. SNELL, A. M., AND COMFORT, M. W.: Incidence and Diagnosis of Pancreatic Lithiasis: Review of 18 Cases. Proc. Staff Meet., Mayo Clinic. **17:** 209–211, 1942.
2. JALESKI, T. C.: Pancreatic Lithiasis. Ann. Int. Med. **20:** 940–947, 1944.
3. BELING, C. A.: Calcification of the Pancreas. Am. J. Digest. Dis. **7:** 231–234, 1940.
4. BELING, C. A., BAKER, C. F., AND MARQUIS, W. J.: Pancreatic Calcification. Radiology **38:** 188–190, 1942.
5. KING, A. B., AND WAGHELSTEIN, J. M.: Calcification of the Pancreas. Arch. Int. Med. **69:** 165–176, 1942.
6. DARLING, H. C. R.: Case of Progressive Calcification of the Pancreas Secondary to Chronic Relapsing Pancreatitis. M. J. Australia **2:** 7–8, 1942.
7. PASTERNACK, J. G.: Calcareous Pancreatitis: Report of 3 Cases with Autopsies. Ann. Int. Med. **19:** 757–767, 1943.
8. EDMONDSON, H. A., AND FIELDS, I. A.: Relation of Calcium and Lipids to Acute Pancreatic Necrosis: Report of 15 Cases, in One of Which Fat Embolism Occurred. Arch. Int. Med. **69:** 177–190, 1942.

Obstructive Hydronephrosis

Produced by Aberrant Blood Vessels and Diagnosed by Intravenous Urography[1]

JACOB ABOWITZ, M.D.[2]
Los Angeles, Calif.

ABERRANT blood vessels of the kidney are not uncommon, and very often they produce obstructive hydronephrosis. Until the year 1906, the presence of these blood vessels was of academic interest only, since they were usually found at autopsy or at the surgical table. In that year, the cystoscopic method of pyelography was introduced, that is, radiography of the renal pelvis and ureters after the injection of a radiopaque solution (such as sodium or potassium iodide), with the aid of the cystoscope and ureteral catheter. Shortly after that, Ekehorn suggested the possiblity that aberrant blood vessels of the kidney might in some instances produce obstructive hydronephrosis. However, the preoperative diagnosis in such cases was made only rarely. Recently, the diagnosis of obstructive hydronephrosis due to aberrant blood vessels has been facilitated by the introduction and subsequent improvement of intravenous pyelography, so that at present the preoperative diagnosis is a common occurrence.

Intravenous Pyelography versus Retrograde Pyelography: The intravenous method of urography lends itself admirably to the investigation and to the establishment of the diagnosis of obstructive hydronephrosis produced either by aberrant blood vessels or by any other cause. With this method, we usually obtain roentgenograms demonstrating the true shape, size, and position, as well as function, of the kidney, in contradistinction to the retrograde or cystoscopic method, in which the urinary tract may be either under- or overdistended, unless the pressure of the injected fluid is carefully regulated. The intravenous method causes practically no disturbance of the normal physiologic function of the kidney and does not produce

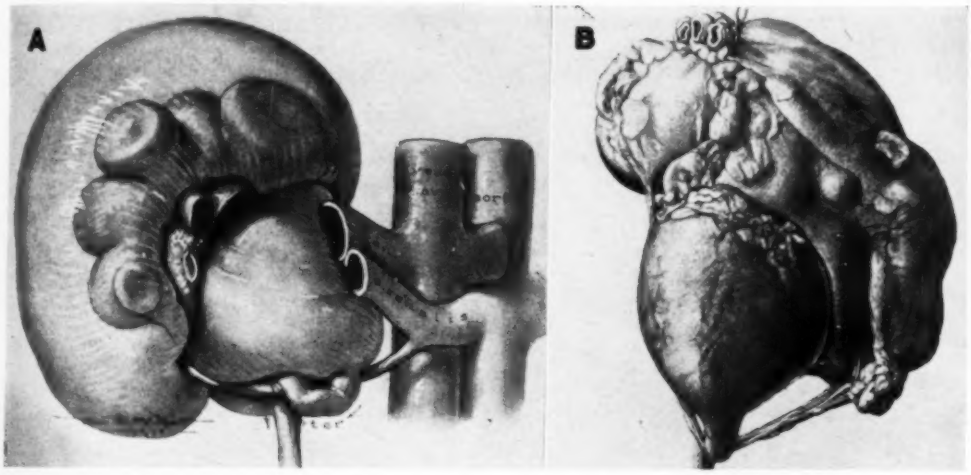


Fig. 1. Diagrammatic illustrations of hydronephrotic kidney caused (A) by a large anomalous artery crossing the upper ureter and (B) by either an adhesive band or obliterated blood vessel.

[1] Accepted for publication in February 1946.
[2] Director, Department of Roentgenology, Cedars of Lebanon Hospital, Los Angeles, Calif.

spasm of the urinary tract nor temporary anuria, conditions often encountered with the instrumentation of cystoscopic examination.

Prevalence of Aberrant Blood Vessels: The presence of aberrant blood vessels is so common that Anson, Richardson, and Minear, in a careful dissection of two hundred cadavers, found only 35 per cent with normal blood vessels supplying both kidneys; the remainder had anomalous vessels of either one or both organs. The same authors quoted Jeidell (1911):

> "So complex is the vascular network in the mesonephric area of the embryo, that one is surprised not in encountering examples of supernumerary vessels in the adult, but rather in finding any case in which a single artery supplies each kidney."

Fortunately, not all aberrant blood vessels produce obstruction; more than half are found at the upper pole of the kidney, above the hilum, and these obviously could not produce ureteral obstruction. Only those blood vessels which are found at the lower pole of the kidney, situated anterior to the ureteropelvic junction, may produce obstruction (Fig. 1). Normally, the kidney is supplied by one renal artery, a branch of the abdominal aorta. It usually enters the kidney through the hilum, where it breaks up into smaller blood vessels, to form the complex renal blood supply. Occasionally, the renal artery branches out, fan-like, before it enters the hilum, and one or more of the lower branches of this fan attaches itself to the lower pole of the kidney, forming an aberrant blood vessel. Often, an independent branch of a lower segment of the abdominal aorta is found supplying the lower pole of the kidney. Occasionally, instead of a blood vessel, we find at operation a narrow band crossing the ureter, which microscopic analysis proves to be an obliterated blood vessel.

Fig. 2. Break in continuity of the ureter at the ureteropelvic junction produced by an aberrant blood vessel, causing obstructive hydronephrosis.

The question always presents itself: Why do symptoms of hydronephrosis occur during adult life, and only rarely in childhood, in spite of the fact that the aberrant

blood vessel is a congenital anomaly? The answer, I believe, lies in the fact that the urinary tract and the blood vessels belong to two quite distinct sets of organs, each undergoing different characteristic changes during life. The blood vessel may lose some of its elasticity, while the kidney may move down to a lower position, thereby falling over, so to say, a stretched blood vessel, consequently compressing the ureter.

Importance of a Complete Diagnosis: In the present state of development of diagnostic roentgenology, it is not enough for the roentgenologist to consider the finding of hydronephrosis a complete diagnosis; he must endeavor to establish the cause, whether obstruction or infection, and if obstruction, what kind and where, so that the proper treatment may be instituted.

Roentgen Findings: The urographic findings in hydronephrosis, for the purposes of this presentation, may be divided into two groups: (1) general findings common to hydronephrosis, regardless of cause; (2) specific findings characteristic of hydronephrosis produced by aberrant blood vessels

(1) The first group of findings as seen on the x-ray film are as follows:

(*a*) Blunting, enlargement or spherical dilatation of the minor calices; abbreviation or dilatation of the major calices; dilatation of the renal pelvis. The degree of involvement of these structures depends on the severity and duration of the case.

(*b*) Increased radiopacity of the shadow of the hydronephrotic pelvis produced by the excreted chemical [3] on the affected side, as compared with the radiopacity of the pelvis of the opposite, unaffected side. This increased radiopacity is due to the larger volume of the affected pelvis.

(*c*) The normal renal pelvis, as demonstrated on the roentgenogram, is usually empty when the patient is in the upright posture. With ureteral obstruction, the pelvis is either partly or completely filled, even with the patient upright, producing a urinary stasis above the obstruction. This urinary stasis increases the dilatation of the renal pelvis, forms precipitates of urinary salts which aid in the formation of renal calculi, and is responsible for the subjective symptoms. It also predisposes the kidney to infection.

(*d*) The ureter is usually empty below the point of obstruction.

(2) The second group of roentgenographic findings are those due to aberrant blood vessels:

(*a*) It is obvious that the aberrant blood vessel producing the obstruction is not visible on the film, as it is practically of the same density as the surrounding tissue, so far as x-rays are concerned. One sees, however, on the intravenous urogram, when the pelvis and ureter are filled with the excreted radiopaque solution, a break in continuity, or a sharp narrow line at the ureteropelvic junction crossing the ureter (Fig. 2). This sharp line is the constric-

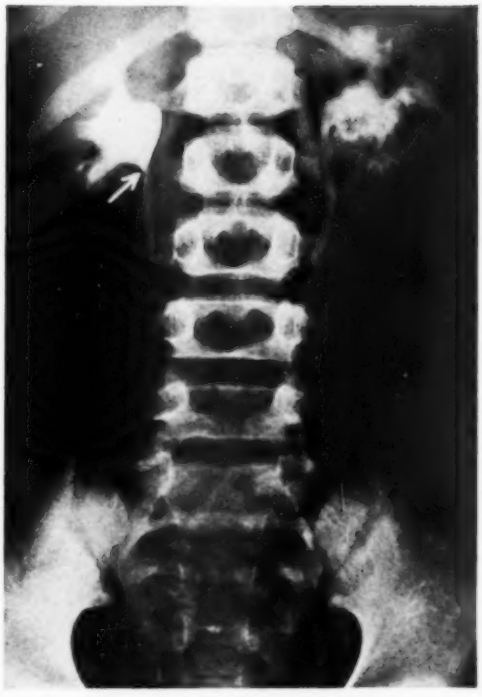


Fig. 3. Square renal pelvis, with the ureter inserted in the angle of the square. Note also the constriction at the ureteropelvic junction which, at operation, proved to be due to an aberrant blood vessel.

[3] Disodium N-methyl-3,5-diiodochelidamate (Neoiopax).

Fig. 4. "Derby-hat appearance" of the pelvis. A double constriction is present at the ureteropelvic junction, by two blood vessels.

tion produced by the aberrant blood vessel. Occasionally, more than one such line is present, probably due to several branches of the blood vessel crossing the ureter. Often, the constriction is hidden behind the renal pelvis, in which event the distal end of the pelvis may form a small knob-like dilatation.

(*b*) As the obstruction develops, either insidiously or rapidly, a characteristic change is found in the outline of the renal pelvis. Normally, the pelvis is funnel-shaped, tapering down gradually to meet the ureter. When an aberrant blood vessel crosses it, the pelvis forms a right angle or a square, the mesial border of the pelvis is parallel and adjacent to the edge of the psoas muscle, the ureter is seen at the lower mesial corner of the square. The proximal end of the ureter, in this case, does not flare out to meet the pelvis, but is of uniform caliber throughout, like a drinking straw (Fig. 3).

(*c*) As the hydronephrosis progresses, the pelvis loses its angular or square shape and assumes a "derby-hat appearance," with the ureter in the center of the crown. The pelvis retains this shape, even when it reaches its maximum dilatation (Fig. 4).

(*d*) The minor calices become affected at a much later period, when the pelvis is already perceptibly involved. This is true in all high ureteral obstructions.

(*e*) On several occasions at operation, instead of aberrant blood vessels, adhesions or adhesive bands were found crossing the ureteropelvic junction. Microscopic study of these adhesions showed obliterated blood vessels among them.

CONCLUSION

The value of demonstrating the change in appearance of the renal pelvis to square or derby-hat shape lies in the fact that from this alone a correct diagnosis can be made, even when the obstructive line in the ureter produced by the aberrant blood vessel is hidden behind the pelvis and is not visualized on the film.

615 S. Bonnie Brae St.
Los Angeles 5, Calif.

A Practical Technic for Visualization of the Bronchial Tree[1]

GILBERT W. HEUBLEIN, M.D., and CLARENCE D. N. GILFILLAN, M.D.

BRONCHOGRAPHY as a diagnostic measure is often indicated when any of the following conditions is suspected: bronchial obstruction, mural growth, pulmonary neoplasm, atelectasis, recurrent bronchopneumonia, a chronic suppurative process. The procedure is definitely contraindicated in the presence of acute inflammatory disease of the tracheobronchial tree. It should be deferred in patients with acute upper respiratory infection and should be used with hesitation in those suffering from asthma.

Bell (1), in a recent communication dealing briefly with the method of bronchography in use at the Percy Jones General Hospital, emphasizes the importance of complete mapping of the bronchial tree by use of lipiodol. He writes:

"Bronchography with lipiodol as a contrast medium is an important examination and no effort is spared to delineate all portions of the bronchial tree. The importance of complete filling of all branches is shown by the number of patients in whom there has been bronchiectasis in one of the lower lobes, but with involvement of other lobes as well. This is particularly true of the lingular branch of the bronchus of the left upper lobe. If bronchography is resorted to, a complete examination of all branches is essential.

"All lipiodol instillations are done in the X-Ray Department by a member of the chest group. The injection is made through a flexible catheter passed into the upper part of the trachea. The filling of the bronchial tree is done under fluoroscopic guidance, making certain that all branches are satisfactorily outlined, the patient being placed in various positions to insure complete filling of all lobes."

The purpose of this paper is to present in greater detail the technic referred to by Bell, describing more specifically the positioning of the patient and the manner of instilling the contrast medium. The procedure finally established was evolved through the co-operative effort of various individuals, particularly the physicians of our chest group, and through valuable experience gained by trial and error. This method, although not entirely unique, has the advantage of speed and accuracy.

PREPARATION

The patient is given postural drainage for a period of fifteen minutes the night and morning before the examination. The postural drainage should be completed one hour prior to bronchography.

For the average adult patient, unless there is some contraindication, medication consists of sodium nembutal or seconal, gr. 1 1/2, given two hours before, and morphine sulfate, gr. 1/4, administered one hour before the expected time of arrival in the X-Ray Department. Atropine is contraindicated, since it produces inspissation of the bronchial secretions and prevents adequate filling of the terminal bronchioles.

In general, asthmatic patients do not withstand bronchography well, and this procedure is ordinarily reserved until all other diagnostic methods have failed to demonstrate co-existing tracheobronchial pathological changes. The medication of choice in such cases is adrenalin 1:1000 to 1:10,000, as morphine sulfate is usually not well tolerated.

The patient is taken to the fluoroscopic room on a litter. Upon arrival in the X-Ray Department his fears are allayed by describing the procedure to follow. Assurance is given that no undue difficulty will be encountered during the subsequent examination. This is done to obtain maximum co-operation. The patient is further instructed to follow directions and is specifically warned that he must refrain from coughing.

After the patient's confidence has been gained, the oropharynx and tonsillar fossae are anesthetized with swabs of pontocaine

[1] Read by title at the Thirty-first Annual Meeting of the Radiological Society of North America, Chicago, Ill., Nov. 9–10, 1945.

Fig. 1. Instrument set-up for bronchography. This should include 2 per cent pontocaine, Jackson laryngeal forceps, laryngeal cannula, flexible catheters with metal adapters, and 2-, 3-, and 10-c.c. syringes. Lipiodol (La-Fay) 40 per cent is the contrast medium used.

2 per cent (Fig. 1).[2] In like manner, by means of the Jackson laryngeal forceps and swabs, the piriform sinuses are anesthetized, as is the dorsal surface of the tongue and epiglottis. Then, aided by indirect laryngoscopy, the examiner drops 0.5 c.c. of 2 per cent pontocaine directly on the vocal cords, through a laryngeal cannula. Following this, 2 c.c. of the pontocaine mixture is injected directly into the trachea (Fig. 2) and the patient is instructed to cough in order to spray the anesthetic agent throughout the tracheobronchial tree.

A No. 14 flexible rubber catheter is passed through the nose and the nasopharynx, into the proximal third of the trachea (Fig. 3). The external portion of the catheter is strapped to the face by adhesive tape, and the patient, sitting on a stretcher, is positioned in front of the upright tilt table or fluoroscope.

A syringe containing 10 c.c. of lipiodol is securely locked to a metal adapter at the proximal end of the catheter. The position of the catheter is checked by fluoroscopy and care is taken to see that the tip lies above the carina, so that either the right or left stem bronchus may be injected.

[2] The authors are indebted to Mr. H. Wall for his excellent photographic reproductions.

EXAMINATION

The patient should be sitting with his hips slightly anteriorly, thus forming a 25 to 35-degree angle between his back and the table top, to facilitate filling of the dorsal bronchi (Fig. 3). The involved side is examined first. The patient is positioned in a 10-degree lateral tilt until a small amount of lipiodol, approximately 2 c.c., reaches the stem bronchus in question. As the lipiodol passes the carina into the stem bronchus, the patient is restored to the vertical position. Because of its viscosity, the oil will continue to flow into the paracardial and mediastinal branches, usually without entering the opposite side. As soon as it is ascertained that lipiodol is entering the lower lobe secondary bronchi, the patient is tilted into the extreme lateral position, with the upper shoulder rotated anteriorly, as demonstrated in Figure 4.

If the right lung is the first to be examined, as the lipiodol enters the orifice of the middle lobe bronchus, the patient is

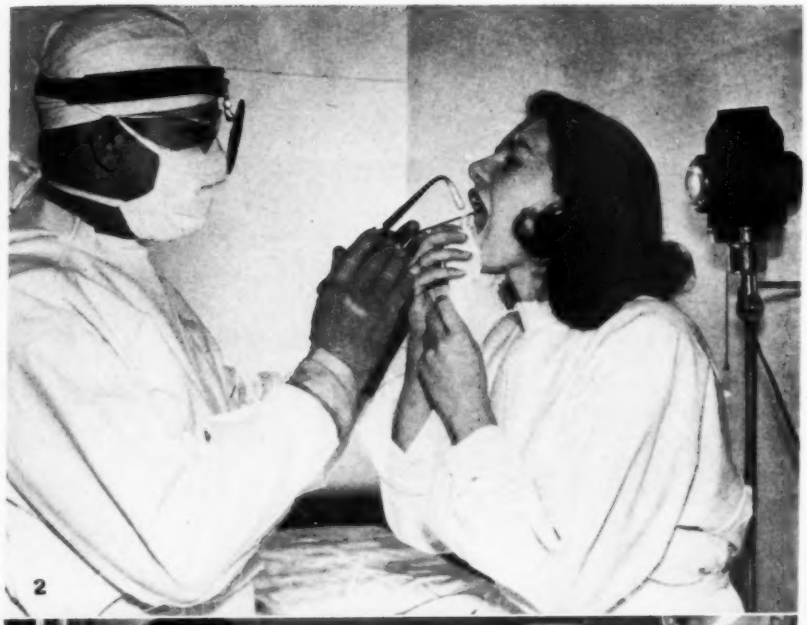


Fig. 2. Position of examiner prior to injection of pontocaine (2 c.c. of a 2 per cent solution) into the lumen of the cervical trachea. Topical anesthesia has previously been applied and has taken effect. The laryngeal mirror, held in the examiner's left hand, affords a satisfactory view of the vestibule and vocal cords.

Fig. 3. Position of the radiologist with respect to the physician and patient during instillation of lipiodol. Note the angle (*a*) between the patient's back and the table top. This posture facilitates complete filling of the dorsal bronchial radicles.

Fig. 4. To fill the right middle bronchus, the left shoulder is rotated forward, as shown. The lingular branch of the bronchus of the left upper lobe is outlined by the reverse of this procedure, *i.e.*, positioning the patient to the left, with ventral rotation of the right shoulder.

Fig. 5. The apical branches are filled by placing the patient in the modified knee-chest position. The shoulder on the opposite side is slightly elevated.

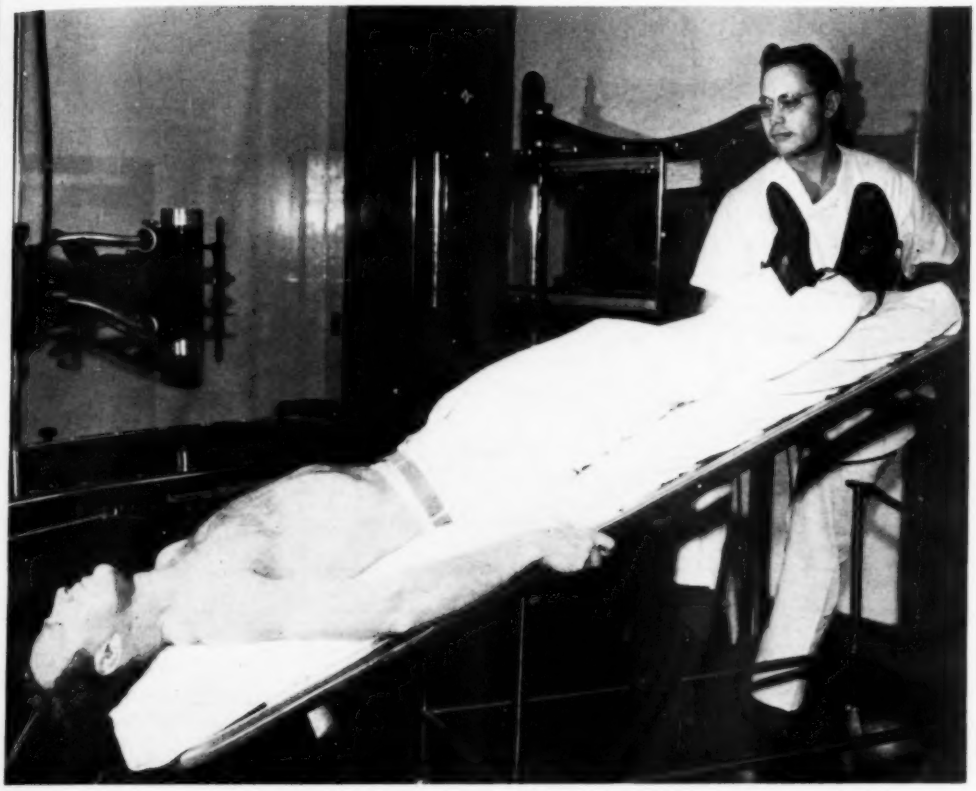


Fig. 6. Posture of patient in dorsal recumbency, with the foot of the stretcher elevated. Preceding radiography the patient is rolled to the lateral decubitus on the side under investigation and finally turned to the prone position, with the foot of the stretcher still elevated.

brought well down on the right shoulder, the left shoulder being rotated anteriorly. Lipiodol should be injected continuously during this procedure. If it is now demonstrated that lipiodol has entered the upper lobe bronchus, the patient is placed in a modified knee-chest position to ensure adequate filling of the apical branches (Fig. 5). He is then requested to lie prone on the litter, the foot of which is elevated approximately 30 to 35 degrees. He is also instructed to turn on the affected side and finally assumes a position of dorsal recumbency, as in Figure 6.

As soon as the above procedure is completed, the skin is inspected to make certain that no lipiodol is present externally. Erect postero-anterior, left anterior oblique, and right lateral films are then obtained.

As soon as these exposures have been made, a similar procedure is carried out for the left lung field. The left stem bronchus and paramediastinal branches are injected and the left side is completely filled, with anterior rotation of the right shoulder, and with the patient in the extreme left lateral decubitus position as in Figure 7. As before, the foot of the litter is elevated so that the upper lobe branches are fully outlined. As soon as this positioning is completed, the patient is again placed in front of the plate changer and erect postero-anterior and right anterior oblique views of the left lung field are made (Fig. 8).

Failure to fill a specific branch of the lower lobe is not an indication for continued injection of lipiodol, as pooling may result in some areas, completely obscuring the entire lung field. The whole procedure ordinarily requires seven to ten minutes.

If cyanosis develops during the examination, only one side is injected and bronchography of the opposite lung field is reserved for a later date. This is not infrequently the case in patients with a history of asthma, even without previous history of iodine sensitivity.

The catheter is finally removed and the patient instructed to expectorate as much mucus as possible. Postural drainage under the supervision of the ward nurse is carried out as soon as the patient returns to his bed.

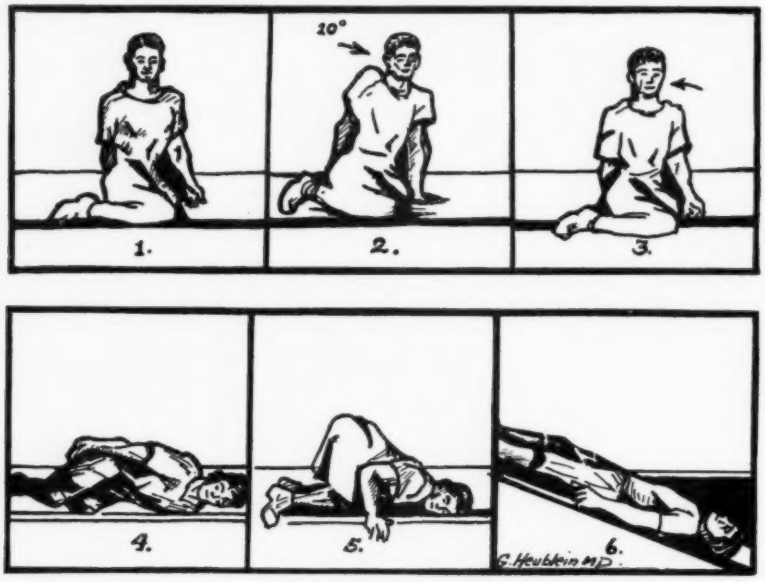


Fig. 7. Composite illustration showing posturing of patient throughout investigation of the left lung field. 1. Position at beginning of examination. 2. Ten degrees tilt to the left. 3. Return to vertical. 4. Left lateral decubitus. 5. Modified knee-chest position. 6. Trendelenburg.

REACTIONS

Occasionally on completion of bronchography the patient runs a low-grade fever for one to three days. This is usually transient and of no serious consequence.

Untoward reactions are not altogether unusual with topical anesthetic agents but were not encountered when we changed from 5 per cent cocaine hydrochloride to 2 per cent pontocaine. The reactions in all cases were mild to moderate. The signs and symptoms, as described by our anesthesia service at the time, were as follows: fall in blood pressure; bradycardia, providing no epinephrine had been previously used; pallor; sweating; apprehension; tremor; dyspnea; mild cyanosis; convulsive seizures similar to those noted in grand mal attacks, including tongue biting, cyanosis, frothy mucus at the mouth, and convulsive movements of the body.

The treatment outlined by Tuohy (3) is as follows:

1. Cessation of administration of anesthesia.
2. Immediate intravenous administration of a soluble barbiturate, such as pentothal sodium 2.5 per cent, or solution of sodium amytal or nembutal. The barbiturate is administered slowly in fractional doses, which are usually enough to control the convulsions.
3. Inhalation of oxygen.
4. Careful supervision of the patient after the convulsion has been ar-

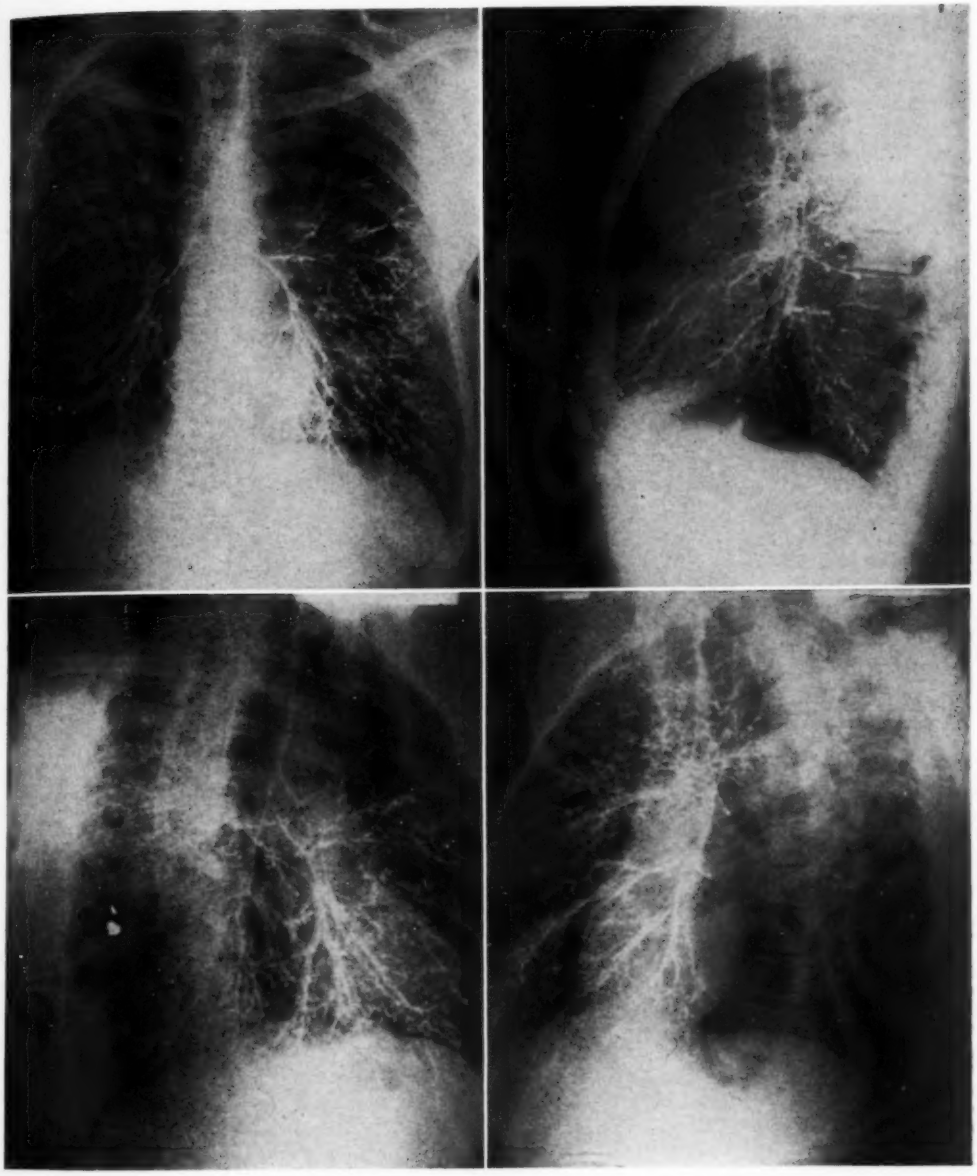


Fig. 8. Bronchograms obtained by method described in text. These show complete visualization of all branches of the bronchial tree. Note the excellent delineation of the lingular branch on the right anterior oblique projection.

rested, since repeated attacks may occur if an insufficient amount of barbiturate has been administered.

The importance of having oxygen and pentothal sodium, 2.5 per cent, readily available cannot be too greatly stressed. Tovell (2) states that pontocaine reactions, when they do occur, are readily remediable providing oxygen and a soluble barbiturate are available. Cocaine hydrochloride, on the other hand, is particularly dangerous because of its toxic action on the cardiac musculature.

Reactions may be avoided by conservative administration of the topical anesthetic. Indiscriminate spraying of the pharynx and glottic area and the use of sopping wet pledgets of cotton are contraindicated (Tuohy).

SUMMARY

A simplified method of lipiodol bronchography has been briefly outlined. The success of the procedure depends upon adequate preparation, proper choice and application of the anesthetic agent, and careful, rapid positioning of the patient under fluoroscopic control to obtain complete mapping of the bronchial tree.

179 Allyn St.
Hartford, Conn.

REFERENCES

1. BELL J. C., AND HEUBLEIN, G. W.: Diagnostic Roentgenology in an Army General Hospital during the Present War. Radiology **43:** 454–455, November 1944.
2. TOVELL, R. M.: Personal communication.
3. TUOHY, E. B.: Personal communication.

Cephalopelvimetry[1]

LOUIS A. SCARPELLINO, M.D.
Kansas City, Mo.

ALTHOUGH childbirth is a normal physiological function, one is impressed with the many difficulties of the obstetrical patient, and also of the obstetrician, despite the fact that nature has apparently provided a considerable margin of safety. Statistically, in only a very small percentage of all pregnancies is a true cephalopelvic disproportion encountered. It is of interest, however, to the obstetrician, should his patient be in this classification.

Since 1897 (1) attempts have been made to measure the maternal pelvis roentgenologically. The various methods of pelvimetry—external, internal, and radiologic—give information relative to the linear measurements and conformation of the pelvis, but the fetus for the most part has been assumed to be normal. Any method of measurement that does not consider the fetus to be delivered with an accuracy comparable to that with which the linear measurements of the maternal pelvis are determined must be considered incomplete.

From a practical standpoint, it seems illogical to calculate the linear measurements to one-tenth of 1 per cent when, in the natural course of events, the physiological process allows for a 20 to 30 per cent margin of safety. This margin is further influenced by factors of morphology, dynamics, moldability, resistance, position, and presentation, some of which cannot be evaluated by roentgen methods. Obviously, somewhere between the meticulous measurement of radiology and the utter disregard of any roentgen study there must be a common meeting ground between the obstetrician and the radiologist.

The obstetrician who is entrusted with the responsibility of the mother and child should be the judge of the necessity for cephalopelvimetry, but there are indications other than personal judgment, as when the clinical examination and the history suggest abnormality of size or type of pelvis, or size of fetus; when there is a history of previous dystocia or fetal death; when vaginal examination is contraindicated or such examination gives insufficient information, and, lastly, during labor, if dystocia is present, to localize the site of the arrest. For the most part, however, labor is an emergency which does not readily lend itself to diagnostic procedures, except those of maximum simplicity, and, as a general rule, accuracy and simplicity do not go hand in hand. With few exceptions, a patient in active labor is primarily an obstetrical and not a radiological problem. Hence, only by proper preliminary teamwork between the obstetrician and the radiologist can warning be given and possible disaster be circumvented.

As Hirsch (2) pointed out in 1922, all methods of roentgen pelvimetry represent modifications of the following: (1) comparative method; (2) teleroentgen or orthodiagraphic method; (3) position frame method; (4) stereoscopic method; (5) triangulation method. The last three are considered to be highly accurate and informative when properly evaluated, but no single one of these methods is without some inadequacy or limitation.

One of the factors contributing to the difficulty of labor is the size and weight of the fetus. Unquestionably, weight and size are to be considered, but if the head of an apparently normal fetus can be delivered, the act of parturition can be consummated. From a clinical-obstetrical as well as a roentgen mensuration standpoint, cephalopelvimetry resolves itself into two

[1] From the Departments of Radiology and the Departments of Obstetrics, Kansas City Municipal Hospital No. 1 and St. Lukes Hospital, Kansas City, Mo. Read by title at the Thirty-first Annual Meeting of the Radiological Society of North America, Chicago, Ill., Nov. 9–10, 1945.

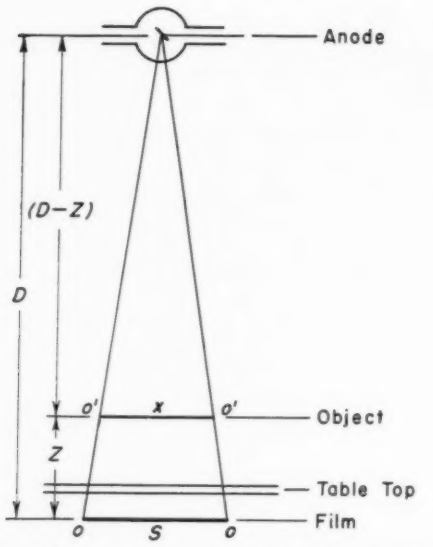


Fig. 1. D represents the anode–film distance; $(D - Z)$ the anode–object distance; S the size of the shadow on the film; X the size of the object. By proportion and construction:

$$D:(D - Z) = S:X$$

Solving for X:

$$DX = S(D - Z).$$

$$X = \frac{S(D - Z)}{D}$$

main procedures: determination of the capacity of the maternal pelvis and determination of the size of the head that must be delivered. Other factors, as presentation, position, and morphology, are partially determined by roentgen methods, but the unknown factors of dynamics, moldability, resistance, rotation, and descent can only be evaluated clinically. If, however, the obstetrician can be informed as to the capaciousness of the individual pelvis relative to the size of the fetal head, the remaining problems are matters of experience and judgment.

To fulfill the radiological requirements, the following criteria are submitted:

1. The measurements must be accurate to within a small margin of error.
2. The measurements should have a common denominator of comparison.
3. Pertinent facts must be available and understandable and should be easily interpreted by both radiologist and obstetrician.
4. The method should have few if any limitations of applicability and should be a benign procedure in so far as the patient and the fetus are concerned.
5. The procedure should be capable of accurate duplication under ordinary working conditions.
6. Personal factors should be obviated.

It is not the purpose of this paper to review the voluminous literature on pelvimetry and fetometry, but to present a modification of a method which provides valuable information for obstetrician and radiologist, and meets the requirements and limitations imposed by pregnancy.

The method proposed by Ball and Marchbanks (3), in which the linear measurements of the maternal pelvis and the circumference of the fetal skull can be expressed in terms of volume, represents a decided advance in roentgen cephalopelvimetry and has caused a considerable awakening of interest. This method of measurement depends on several assumptions which admittedly are in slight error but are valid within practical and physiological limits. In most other methods of cephalometry, attempts are made to measure the linear diameter of the fetal skull, but there is no assurance that the particular linear diameter measured represents the dimension that is to be delivered. Also, because of rotation and position of the fetal head, this linear measurement is difficult to obtain accurately and is unquestionably subject to considerable error.

In the formation of roentgen shadows, as shown in Figure 1, when the anode-film distance is known and the anode-object distance can be ascertained, one can compute the size of the object from the size of the shadow on the film. Furthermore, by obtaining the linear dimension of the pelvis at various fixed points, the volume of a sphere that can be placed between these points can be calculated, as the volume of a sphere is $4/3\ \pi r^3$.

The volumetric determination of the fetal head offers a slightly more formidable problem. While it is true that the fetal head is in most instances spheroid, it is also

approximately true that, if the circumferences of the spheroid are taken at right angles, the volume determined from their mean average will approach the volume of a sphere having the same perimeter measurement. Practically, therefore, the fetal head may be considered a sphere. During the course of labor the various circumferences (and, in turn, the diameters) of the head are influenced by the driving force of the uterus, the resistance of the soft tissue, and the bony structures of the maternal pelvis, together with the acts of flexion, rotation, and descent which accommodate the head to the various diameters of the pelvis. So far as is known, the volume of the head is not changed but the shift in the position of the head alters its configuration. Whether the fixed bony points of the pelvis are shifted during the process of labor is subject to considerable controversy.

From the accompanying diagram (Fig. 2), it is seen that, as one circumference or

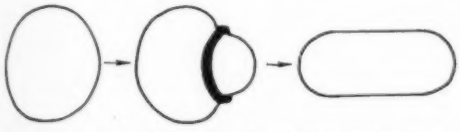


Fig. 2. Changing shape of moldable spheroid.

diameter of the spheroid is changed, the other changes accordingly. The volume of the spheroid is not affected. Theoretically, one diameter of the fetal head could be a point (actually the thickness of a cell), in which case the opposite diameter would approach infinity, a condition that is not compatible with life. Necessarily, one must arrive at the maximum limit of disproportion allowable in the various types of pelves and fetal positions.

According to Ball and Marchbanks (4), the symphysis pubis is the fixed point from which all measurements in the mid-sagittal plane of the body are made. This assumption is valid when the symphysis, fetal head, and mid-sagittal plane of the sacrum coincide with the long axis of the film. Technically, it will be noted that in any given case of vertex presentation, the fetal head, the symphysis, and the sacrum are projected simultaneously on a flat surface from varying object-film distances. It is not always possible to achieve the optimum of projecting these three points on the same longitudinal axis of the film.

In my experience, when the symphysis and sacrum do not coincide, the error relative to the fetal head volume is considerable. To reduce the error of magnification under these conditions, I have found it necessary to bisect the difference between the ventral and dorsal mid-sagittal planes, to arrive at the object-film distance for the lateral circumference of the fetal head. Furthermore, in order to find a more consistent locus for the measurement of the object-film distance of the fetal head in the anteroposterior and lateral projection, a point less subject to personal vagaries is ascertained if dividers are used to approximate the geometrical center of the fetal head rather than its equatorial plane.

In the case of breech presentation, in the ordinary anteroposterior projection, with the patient either standing or supine, the fetal head is distorted and magnified to such an extent as to cause poor delineation. These factors are further influenced by the range of motion of the fundus of the uterus. To correct these possible sources of error, the postero-anterior standing projection rather than the anteroposterior is used, together with a right or left lateral projection, depending on the position of the fetal head relative to the mother. The central ray is directed to the fetal head on the two smaller films. By this technic, the fetal head is closer to the film, easier to delineate, and subject to less distortion. In order to find a fixed point to correct for the object-film distance for the fetal head, it is necessary to place a metal marker on the most ventral portion of the mother's abdomen in the mid-line and to measure the distance to the table top plus the table top-film distance to arrive at the object-film distance. In the lateral projection, the corrected distance from the lead marker to the geometrical center of the head becomes the object-table top distance in the postero-anterior

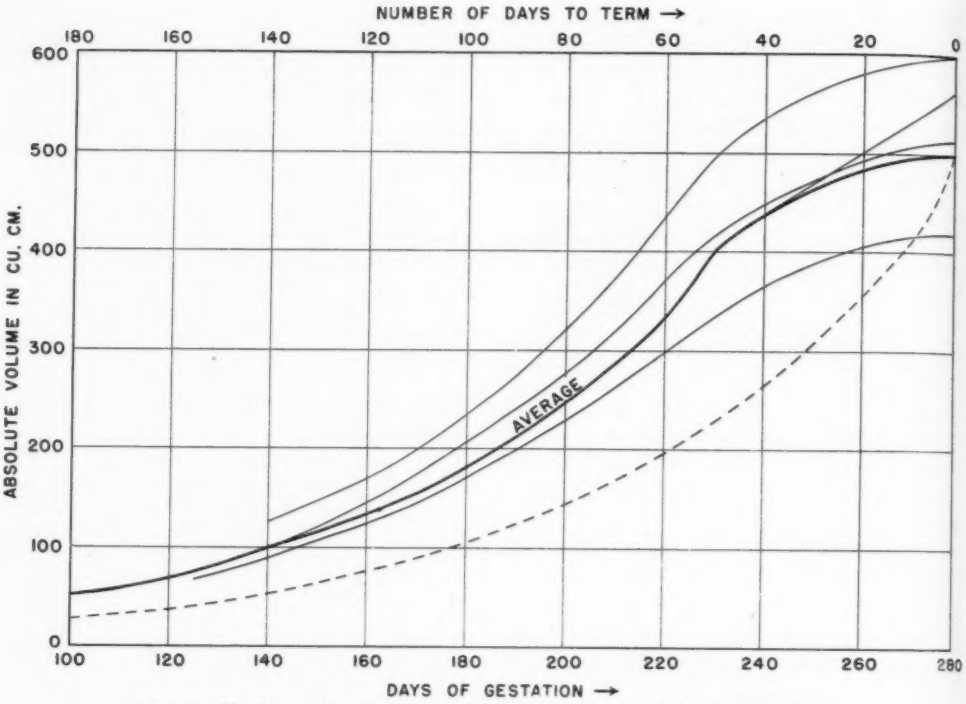


Fig. 3. Absolute volume increase of fetal head in relation to days of gestation.

view. A similar correction may be necessary in the lateral projection.

By the use of the lumbosacral pad, as described by Caldwell and Moloy (5), the inclination of the superior strait (with the patient in the supine position) has been approximately 30 degrees. Hence, by placing both anterior superior spines on the same horizontal plane (with the aid of a spirit level), tilting the tube 15 degrees toward the feet, and directing the central ray midway between the anterior superior spines, the superior strait is projected on the film and the obstetrical conjugate becomes the yardstick. It is evident that by this projection all diameters on the same plane will be magnified to the same degree and may be corrected by reduction to the known diameter, the obstetrical conjugate. The error known to exist by the use of this method is not objectionable, and this projection has been of value in the determination of the capacity of asymmetrical pelves. Its use, however, is quite limited.

The crown-heel measurement, the occipito-frontal diameter, and the ossification centers are reasonably accurate indications of fetal age. It must be admitted that these are sometimes difficult if not impossible to obtain from the film, due to the habitus of the fetus or to the inclination of the head. In any pregnancy, the size of the fetus is limited at conception by the volume of the fertilized ovum and at term by the mean volume of the fetal head, which fairly well parallels the fetal size and age.

The accompanying graph (Fig. 3), based on 500 cases in which cephalopelvimetry was done by the modified Ball-Marchbanks technic described above, shows that if the absolute volume of the fetal head (volume without scalp) is plotted against the number or days to term (on the basis of 280 days gestation), a smooth curve results. From the available data, it appears that the absolute head volume is doubled about every forty-five days, up to about fifty days before delivery, at which point

the curve changes its slope. It is also noted that if the geometrical center of the head falls below the obstetrical conjugate the head volume increases at a lesser rate than if the center remains above this line throughout pregnancy, up to the date of delivery. Needless to say, this method (except in the anencephalic fetus) is always applicable. It is relatively easy to obtain and in those cases in which such information has been of importance we have found this graph accurate, not only to ascertain the maturity of the fetus but also to determine the length of gestation and the probable date of delivery. This is the subject of further study to be reported later.

As shown on the graph, measurements taken on the delivered fetal head (average of the suboccipital-bregmatic and occipitalfrontal circumferences, translated into terms of volume) were compared with measurements on the x-ray film ranging from 155 days before delivery and corrected to date of delivery. In this series the average error in the calculated head size as compared to the delivered head size has been ±10 c.c. (or ±2 mm. in circumference). On the basis of the series studied, the method of Ball and Marchbanks (3, 4), as modified, seems to meet the requirements and limitations of a roentgen method of cephalopelvimetry on a practical basis.

The obstetrician is not particularly disturbed in those cases in which the pelvis is obviously adequate relative to the fetal head, nor is he especially concerned in those cases in which there is a cephalopelvic disproportion which can be evaluated clinically. It is the marginal case, in which the volume capacity of the various planes of the pelvis is about equal to or less than the volume of the fetal cranium, that is of interest to obstetrician and radiologist alike.

In our experience, the difficulty and duration of labor, as well as the incidence of operative assistance (manual rotation, version, forceps, cesarean section) increase as the disproportion between the fetal head and the smallest plane of the pelvis approaches 200 c.c. in the anterior and 135 c.c. in the posterior rotation. From the radiological point of view, when disproportion of this extreme is manifest, it is imperative to inform the obstetrician that difficulty may be anticipated, so that an attempt may be made to find some method of compensating for the excessive disproportion. Further research may establish the exact volume disproportion allowable in the various types of pelvis, position, and presentation. Until such factors are definitely established, the radiological data should be limited to determining the cephalopelvic ratio and supplying information that may reduce the incidence of lasting injury to the mother and child.

CONCLUSIONS

1. A modification of the Ball-Marchbanks method of cephalopelvimetry is described.

2. In 500 cases studied at various intervals during pregnancy, the head measurements obtained from the roentgenogram and calculated to date of delivery, as compared to the measurement of the delivered fetus, showed an average error of ±10 c.c. in volume or ±2 mm. in circumference.

3. A corrected growth curve is presented, showing the absolute volume of the fetal head *in utero* on the basis of this series.

4. A modified method of measuring the head of the fetus in cases of breech presentation is furnished, as well as a method of measuring the superior strait in asymmetrical pelves.

36 East 52nd St.
Kansas City 2, Mo.

REFERENCES

1. MARTIUS, H.: "Über Beckenmessung mit Röntgenstrahlen: die Fernaufnahmen und der Kehrer-Dessauersche Beckenmekstuhl. Fortschr. a. d. Geb. d. Röntgenstrahlen **22:** 601, 1914.

2. HIRSCH, I. S.: Discussion of paper by Thoms, H.: Outlining Superior Strait of Pelvis by Means of X-Ray. Am. J. Obst. & Gynec. **4:** 316, September 1922.

3. BALL, ROBERT P., and MARCHBANKS, S. S.: Roentgen Pelvimetry and Fetal Cephalometry: New Technic. Radiology **24:** 77–84, January 1935.

4. BALL, ROBERT P.: Roentgen Pelvimetry and Fetal Cephalometry. Surg., Gynec. & Obst. **62:** 798–810, May 1936.

5. CALDWELL, W. E., AND MOLOY, H. C.: Anatomical Variations in the Female Pelvis and Their Effect in Labor, with Suggested Classification. Am. J. Obst. & Gynec. **26:** 479–505, October 1933.

A Case of Acromegaly Presenting Specific Roentgenographic Changes[1]

LT. COL. JOHN H. GILMORE, M.C., A.U.S., and MAJ. THOMAS K. MAHAN, M.C., A.U.S.

OVERGROWTH OF the vertebral bodies by direct increase in their transverse and anteroposterior diameters, and an overgrowth at the costochondral junctions, when present, are specific changes in acromegaly. Though these changes are easily demonstrated roentgenographically, either they are of rare occurrence or they have been neglected in the American radiologic literature. One paper, by Chester and Chester (3), appearing in 1940, deals with the subject.

The following case demonstrated the usual roentgenographic findings of acromegaly plus the unusual and specific spinal manifestations.

CASE REPORT

A white male, 31 years of age, was admitted to the hospital in January 1944, complaining of swelling of the second right costochondral junction and fever of three days' duration. Respiratory movements produced considerable pain.

The patient had injured his left hip in a tug-of-war in 1938, and since that time had complained of intermittent low back pain. He denied any noticeable change in his features and stated that his hands and feet had always been large and that he had difficulty in obtaining properly fitting gloves. The size of his hands he attributed to working with an air hammer. At the age of 19 he was 6 ft. 2 in. tall.

The patient's marital history was not remarkable. He had been married for nine years. There had been no children, presumably because his wife had a pelvic tumor. Libido had been normal.

The remainder of the history was irrelevant.

Physical examination showed a large, well developed, well nourished white male 6 feet 3 inches tall, weighing 235 pounds, with a typical acromegalic head and characteristic prognathism. Examination of the scalp revealed underlying irregularities that were considered to be parallel bone ridges. There was a red, warm, painful mass about 2 inches in diameter over the right second costochondral junction.[2] Examination of the remainder of the skeletal system was essentially negative. There was no limitation of motion in any of the joints. Reflexes were normal.

Routine laboratory tests, including carbohydrate tolerance, were within normal limits except for an increased sedimentation rate, ranging from 22 to 33 mm. The Kahn test was negative. Calcium, phosphorus, and phosphatase determinations were not made.

The significant roentgenographic findings were as follows. In the skull (Fig. 1) there was marked thickening of all the bony plates, particularly the outer tables. The anterior wall of the frontal sinuses and the molar portion of the zygomata were unusually prominent. The hands (Fig. 2) were the typical spade hands of acromegaly. The middle and proximal phalanges were broad, with cortical irregularity of the shafts. The metacarpals showed a similar though less marked change. There was "tufting" of the tips of the terminal phalanges. Examination of the upper right chest anteriorly (Fig. 4) revealed a widening and beading of the chondral tips of the ribs visualized, the change being most pronounced in the third rib. In the lumbar spine (Fig. 3) there was an apparent increase in the anteroposterior diameter of the bodies of the vertebrae, with moderate osteophytic formation on the anterior aspect of the opposing body surfaces. Laminagraphy through the sagittal section of the lumbar vertebrae showed the increase in width of the bodies to be on the basis of new bone formation on their anterior aspects.

The patient's temperature gradually fell by lysis and the mass in the right chest wall disappeared. Tenderness in the area persisted, but was not as severe as on admission. During the stay of six weeks in the hospital there was a loss of 25 pounds in weight, for which no cause was found.

DISCUSSION

In 1931 Erdheim described specific changes in the vertebral column in a case of acromegaly, consisting of excessive growth of cartilaginous disks and vertebral bodies. He showed that the overgrowth took place at the lateral and anterior aspects of the bodies and intervertebral disks, resulting in a thickening of the spinal column. In sagittal sections of the spine and in the lateral roentgenogram, he was

[1] Accepted for publication in December 1945.

[2] The focal manifestation of inflammation at the second right costochondral junction appears to have been coincidental. No direct inflammatory bone change was manifest at the involved site during the period of observation.

Figs. 1 and 2. Roentgenograms of the skull and hands. The lateral view of the skull shows thickening of the tables, more marked in the outer table, and prominence of the malar portions of the zygomata. Definite involvement of the sella turcica could not be demonstrated.

The hands show broadening of the phalanges with cortical roughening of their shafts and "tufting" of the tips of the terminal phalanges.

able to distinguish between the original vertebral bodies, which presented a biconcave configuration, and the additional bone proliferation which extended directly from their anterior and lateral aspects. The opposing aspects of the bodies anteriorly appeared flattened, with the concavities of the original bodies posteriorly placed. Similar proliferation of the cartilage of the intervertebral disks was observed. The

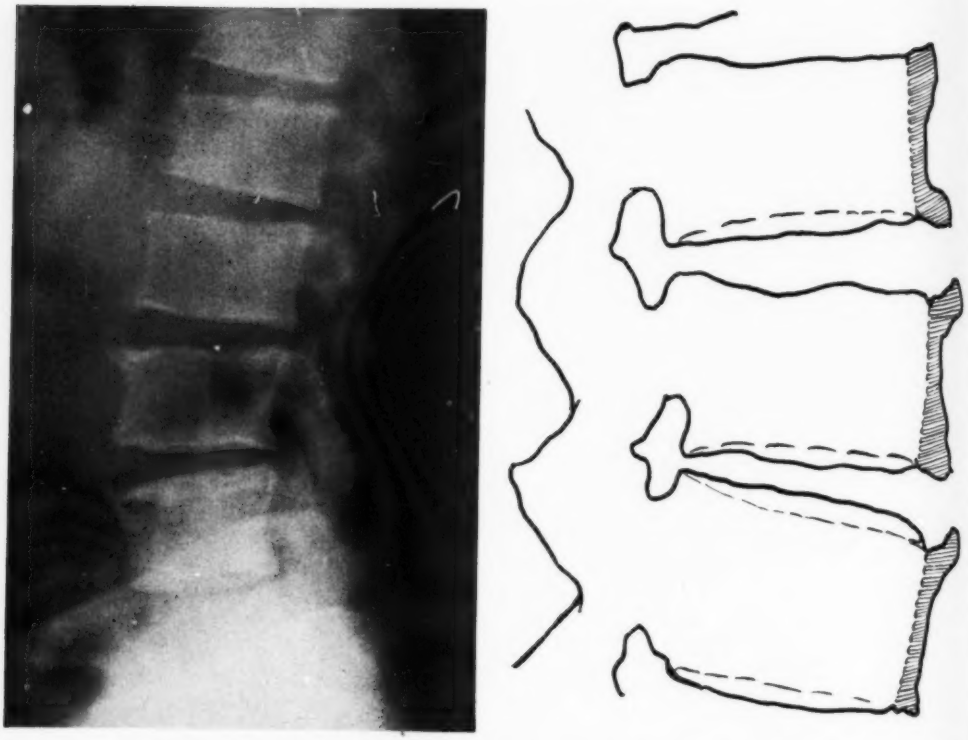


Fig. 3. Lumbar spine, L-2 to L-5, showing new growth on the anterior aspects of the lumbar bodies. Note that there is new growth along the entire anterior aspect of the bodies instead of localized periostosis at the tendinous and cartilaginous attachments, such as occurs in degenerative bone lesions. The latter change, however, so called "parrot-beaking," is superimposed on the new growth. The line drawing of the lumbar vertebrae demonstrates the extent of new growth, which is represented by the shaded areas anteriorly.

nucleus pulposus of each involved disk seemed to be posteriorly placed. This was revealed by sagittal section of the spine at autopsy (1).

Schinz felt that vertebral thickening in the transverse and sagittal diameters was specific for acromegaly and could be easily demonstrated roentgenologically (2).

Chester and Chester reviewed the literature on this subject in 1940 and described the roentgen findings in the vertebral column in eight cases of their own. Five of their patients showed increase in the anteroposterior diameter of the dorsal vertebrae (3).

Waine, Bennett, and Bauer had the opportunity of making a postmortem study on an acromegalic who died of bacterial endocarditis. Roentgenograms revealed an enlarged sella turcica with thinning and slight erosion of the posterior clinoid processes. The intervertebral articulations and dorsal vertebral bodies showed massive spur formations. The ribs showed moderate scalloping. At autopsy a pronounced fusiform widening of the ribs and irregular ossification of the costochondral junctions were observed. There was prominent lateral and anterior lipping of vertebral bodies at the margins of the disks. T-11 and 12 appeared slightly larger in transverse diameter than L-1 and 2. The vertebral changes, however, were not nearly so striking as those described by Erdheim. Waine and his associates were unable to determine whether these changes were definitely related to the specific articular lesions of acromegaly. They stated that they had not previously encountered microscopic lesions such as those ob-

served in the costochondral cartilages. The following description is quoted directly from their discussion (4):

"The alterations consist of marked and irregular hyperplasia and hypertrophy of chondrocytes and increase in matrix in the middle cortical portions of the cartilaginous rib. Coupled with these phenomena is a progressive endochondral ossification at the cartilage bone border. The former are responsible for the prominent beading shown in the photography of the patient and in the Roentgen ray film of the rib specimen (acromegalic rosary). The latter results in advance of the vascular bone marrow into the central avital part of the chondral cartilages and in increased periosteal bone formation at the periphery, so that for a short distance, two concentric layers of trabecular bone may be seen to envelop the former cartilaginous cortex. Thus, nodal as well as circumferential growth has occurred at the cartilage bone border and has led to the abnormal expansion of the thorax, long known as one of the striking characteristics of acromegaly. A comparison between our sections and those shown by Erdheim reveals close similarity in every essential detai' "

CONCLUSION

A case of acromegaly is presented showing x-ray evidence of changes in the spine and at the costochondral junctions almost identical with those described by Erdheim (1), Chester and Chester (3), and Waine, Bennett and Bauer (4).

The overgrowth in the spine demonstrated in this case is specific for acromegaly. It should not be confused with other types of vertebral overgrowth associated with degenerative bone changes.

Fig. 4. The anterior portions of the upper four ribs on the right are visualized. The widening and beading of the chondral tips are most marked in the first and third ribs.

REFERENCES

1. ERDHEIM, J.: Über Wirbelsäulenveränderungen bei Akromegalie. Virchow's Arch. f. path., Anat. **281:** 197–296, 1931.

2. SCHINZ, H. R.: Zur Kenntnis der hormonalen vitaminösen und renalen Osteopathien. Röntgenpraxis **11:** 1–14, January 1939. Abst. in Year Book of Radiology, 1939, p. 41.

3. CHESTER, WM., AND CHESTER, E. M.: The Vertebral Column in Acromegaly. Am. J. Roentgenol. **44:** 552–557, October 1940.

4. WAINE, H., BENNETT, G. A., AND BAUER, W.: Joint Disease Associated with Acromegaly. Am. J. M. Sc. **209:** 671–687, May 1945.

5. ERDHEIM, J.: in Pathologie und Klinik in Einzeldarstellungen. Band III. Die Lebensvorgänge in normalen Knorpel und seine Wucherung bei Akromegalie, Berlin and Wien Julius Springer, 1931. Quoted by Waine et al.

720 North Michigan Ave.
Chicago 11, Ill.

Herniation of the Pericardium

Case Report[1]

MAJ. R. Y. GROMET, M.C., A.U.S., and CAPT. M. J. STEINBERG, M.C., A.U.S.

IT IS WELL KNOWN that with large pericardial effusions the pericardial sac expands backwards and compresses the left lung, resulting in an area of percussion dullness at the angle of the left scapula with bronchial breathing (Ewart's sign) and other signs.

In the case to be reported here, an unusual feature presented itself. A hernia-like pericardial sac expanded and filled anteriorly to the left and extended above the left clavicle. With the patient erect, the pericardial sac would at times appear small or empty, but in the horizontal position it would fill immediately and occupy a large area in the upper left lung field, extending to the lateral chest wall. Simultaneously, the cardiac outline diminished slightly in its transverse diameter.

A young male German prisoner of war had mild retrosternal aching and fever associated with an upper respiratory tract infection. A routine chest film revealed a startling configuration of the heart, with a rounded homogeneous density protruding from the region of the left hilum (Fig. 1). Although the appearance of the shadow was typical of pericardial effusion, there was little clinical evidence of pericarditis or, indeed, of any cardiac abnormality. There was no dyspnea or tachycardia, and the heart tones were loud, clear, and normal.

The patient was observed at the Regional Station Hospital, Fort Sheridan, Ill., for several months after transfer from a nearby Army hospital. During his stay at Fort Sheridan he was in no distress. The pericardial effusion disappeared and reappeared several times. A pericardial tap was done, but no fluid was obtained. It was unfortunate that the tap was attempted at a time when the heart shadow was nearly normal.

Several x-ray and fluoroscopic studies of the chest were made. Figure 1 shows the cardiac shadow at the time of admission to the hospital. Figure 2 shows the change in the cardiac outline at a later date, with the patient in the horizontal position. Figure 3 shows the heart shadow shortly before the pericardial tap was attempted. Figure 4 is the picture obtained before transfer to the Hospital Center, Camp Forrest, Tenn.

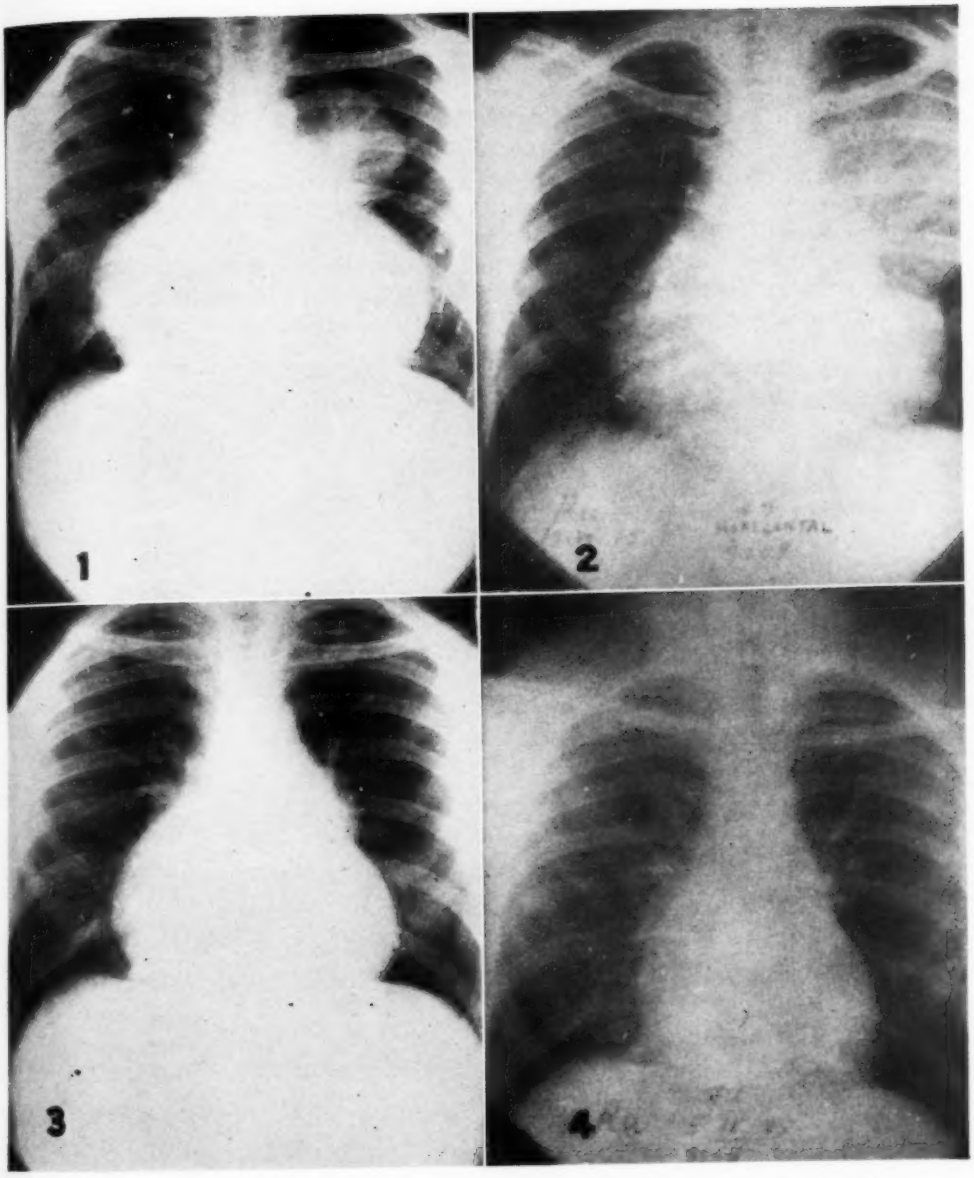
The etiology of this recurring pericardial effusion was not established. It is our belief that there was an underlying chronic serous inflammation of the pericardium, associated with a large hernial sac. This sac probably arose from the vestigial fold of the serous pericardium, which passes from the left pulmonary artery to the left superior pulmonary vein. It was also felt that the ease with which the pericardial cavity could accommodate itself to a large effusion explained the absence of clinical symptoms. Tuberculosis was considered as the most likely etiologic factor. The Mantoux test was positive. Other tests and electrocardiographic studies were of no particular help.

When the patient was transferred to the Hospital Center, Camp Forrest, Tenn., for return to Germany, he was symptom-free, though the cardiac shadow was still somewhat enlarged. Communication with the roentgenologist there, Major Paul E. Wylie (who had the illustrations prepared), elicited the information that a second pericardial tap was not attempted. The effusion, however, had begun to reaccumulate when the patient was returned to Germany.

The brevity of this report is occasioned by the failure to prove conclusively that fluid was present and that the shadow in the left chest was part of the pericardium, and by the fact that the etiology was obscure.

49 Balfour Place
Brooklyn 25, N. Y.

[1] Accepted for publication in February 1946.



Figs. 1–4. Successive views showing the changes in the cardiac outline. See text for details.

Pneumographic Diagnosis of Intraventricular Epidermoid

Report of a Case[1]

ARTHUR E. CHILDE, M.D., and ARTHUR W. YOUNG, M.D.

INTRACRANIAL epidermoids are comparatively rare, the reported incidence being somewhat variable, probably less than 1 per cent of all brain tumours. Intraventricular epidermoids are even less common but, when present, produce a characteristic pneumographic appearance which cannot easily be mistaken for any other lesion. This was first noted by Krieg (1), in 1936, who published two such cases, in one of which he observed irregular rounded shadows in the ventricle.

Quite independently, in 1937, Dyke and Davidoff (2) reported a large right intraventricular epidermoid cyst which was successfully removed. They described an appearance in the encephalogram of irregularly shaped collections of gas distributed through that portion of the right middle fossa normally occupied by the thalamus, island of Reil, temporal lobe, and posterior portion of the frontal lobe. There was slight lateral displacement of the ventricular system, and the right frontal horn and the anterior portion of the lateral ventricle were elevated. Dyke (3) later reported a similar case in which the tumour was situated in the posterior thirds of the lateral ventricles and again he noted large irregular streaks of gas which passed through the substance of the tumour and the area of brain normally occupied by the splenium

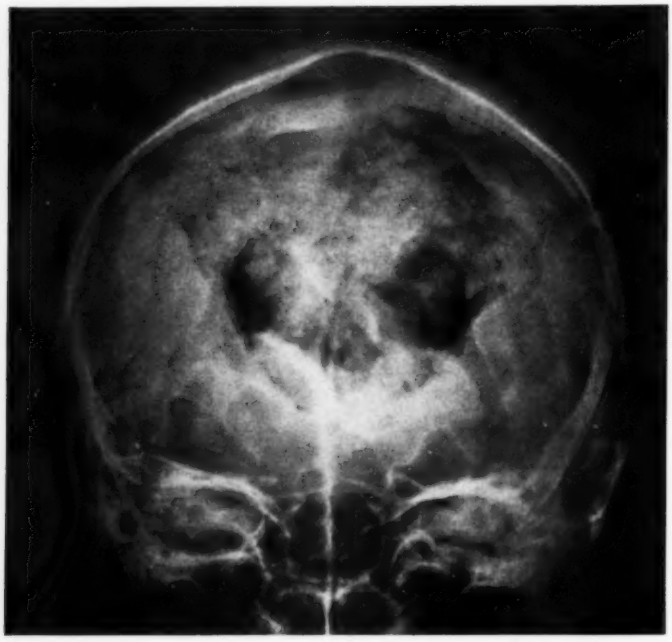


Fig. 1. Anteroposterior ventriculogram. The anterior portions of both lateral ventricles are almost completely filled by tumour tissue, but their posterior portions and the temporal horns are well shown.

[1] From the Department of Neurology and Neurosurgery, McGill University and the Montreal Neurological Institute. Accepted for publication in January 1946.

of the corpus callosum. He felt that this was due to folds in the walls of the tumour.

Weinberger (4) reported two more cases in 1938, one of them verified, and he remarked upon the "sponge-like" appearance after gas injection.

Peyton and Baker (5), in 1942, reported 14 cases of epidermoid and teratomatous tumours of the central nervous system, one of which was an intraventricular epidermoid. The encephalogram in this instance revealed a large cystic area partially filled with air and partially with tumour, situated in the region of the right parietal and occipital lobes and occupying the ventricle but extending far beyond its normal confines. There was displacement of the left lateral ventricle to the left.

In view of the comparatively small number of such cases in the literature diagnosed preoperatively, it is felt to be worth while to report the following case, as it shows the typical pneumographic features of an intraventricular epidermoid that progressed to an extreme size. Except for the progression of the symptoms and moderately raised spinal fluid pressure, an expanding intracranial lesion would not have been suspected. In fact, at different times in the illness such diagnoses as hysteria, disseminated sclerosis, and Parkinson's disease were considered.

Fig. 2. Lateral view with the brow up. This was made without moving the patient, and the distribution of the oxygen corresponds with that in Figure 1. The furrowed appearance of the tumour is well shown; also the marked upward extension toward the bregma.

CASE REPORT

I. D., a 37-year-old white female, was admitted to the Montreal Neurological Institute on Oct. 1, 1944, complaining of weakness of the legs and difficulty in walking. For fifteen years she had been employed as a clerk in the office of a large insurance company without missing a day from work on account of illness. In September 1943 she noticed some difficulty in descending stairs; getting on and off busses and

stepping up onto the curb then became difficult, and soon her walking on the level was awkward and uncertain. If she ran, when in a hurry, she could not stop and would fall forward on her face unless she could catch hold of something to stop herself. In January 1944 she gave up going to the office because her walking was so poor and she was so unsteady. About the same time her writing deteriorated, sometimes being almost illegible. Coordination of fine movements with the right hand was poor, and a fine tremor of the hand developed. The patient complained of some numbness and loss of strength in the right hand and of frequency and urgency of micturition. She thought her vision had deteriorated but she did not suffer from headache or dizziness.

The striking finding on repeated examinations made early in the illness, and while the patient was under observation in the Institute, was the great disturbance in gait. Her steps were short and shuffling and her feet seemed glued to the ground. She walked slowly and, when standing alone, tended to fall backward. When one took her arm, however, or even held the sleeve of her dress, she walked with assurance and confidence, taking normal steps.

There was a mask-like expression of the face and a gentle forward stoop of the body. The fundi were normal and the fields of vision full. Nystagmus was variable, sometimes present and at other times absent, and only brought out on gaze to the left. There was slight asymmetry of the face with a lag of the left corner of the mouth on voluntary movement. Speech was slow and slurred and writing was jerky. Rotation of the hands was done poorly, yet all other movements of the hands were quite good. There was no intention tremor. Strength in the upper and lower extremities was good. All the deep reflexes were greatly exaggerated. The abdominal reflexes were present. The plantar responses varied. Early in the illness a right extensor plantar response (positive Babinski sign) was noted. Later both plantar responses were reported as flexor and while the patient was in the Institute both were found to be extensor. The only sensory change was diminished vibration sense over the right arm and leg.

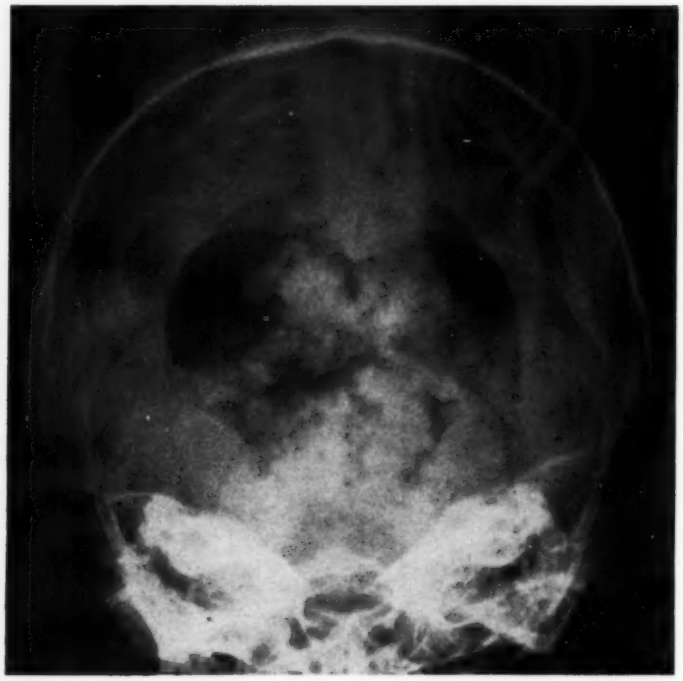


Fig. 3. Postero-anterior view. The posterior portions of the ventricles are somewhat more completely visualized, but otherwise the appearance differs little from the anteroposterior view.

Plain radiographs of the skull made on Oct. 5, 1944, showed some increase in the thickness of the inner table of the frontal bone with moderate irregularity. The sella turcica was not deformed and there was nothing to indicate increased intracranial pressure. A blood Wassermann test was negative and there was no anemia. A lumbar puncture showed the spinal fluid pressure to be 250 mm. of water. The Pandy test was negative and the total

protein measured 21 mg. per 100 c.c. The Lange curve read 1222110000 and the Wassermann reaction was negative.

It was the finding of the moderately raised spinal fluid pressure which prompted encephalography on Oct. 11. This failed to visualize the lateral and third ventricles, but it showed the fourth ventricle, which was small and not displaced. Subarachnoid markings were present in the right frontal region and there seemed to be partial visualization of the callosal sulcus, which presented a wide curve suggesting dilatation of the lateral ventricles. The interpeduncular cistern was small and compressed from above. It was felt that these findings suggested a block, presumably above the fourth ventricle, and a ventriculogram was advised.

Fig. 4. Lateral view with the occiput up. There is seen to be enlargement of the posterior portions of the ventricles, but the tumour does not extend much further backward than the usual position of the glomus of the choroid plexus.

Ventriculography, Oct. 28, showed the posterior portions of both lateral ventricles to be dilated and revealed similar enlargement of the temporal horns. The lateral ventricles did not extend much further forward than usual, but their anterior parts on both sides were so much enlarged upward that they reached to within 1.5 cm. of the inner table of the skull in the neighbourhood of the bregma. These portions of the ventricles were almost filled by soft-tissue masses, through and around which multiple furrows containing gas were visible. The soft-tissue masses were approximately equal on the two sides and extended well posteriorly in the ventricles, although not so far as the occipital horns. The third ventricle was poorly visualized but it appeared to contain a small amount of oxygen in its inferior portion (Figs. 1–5).

The radiographic impression was involvement of both lateral ventricles and probably the third ventricle by a huge intraventricular epidermoid.

On Oct. 29, 1944, Dr. W. V. Cone performed a bifrontoparietal osteoplastic craniotomy of the free-bone-flap type and, so far as he could tell, completely removed the tumour, which was a typical epidermoid or pearly tumour of Cruveilhier. It was very extensive, partially filling the lateral and third ventricles, and presenting itself nearest the surface at the free margin of the falx cerebri. The thin capsule lay in folds or accordion-like pleats, and when traction was made on the capsule the pleats unfolded, leaving added folds behind. There was much cheesy material and in all 41 gm. of tumour tissue were re-

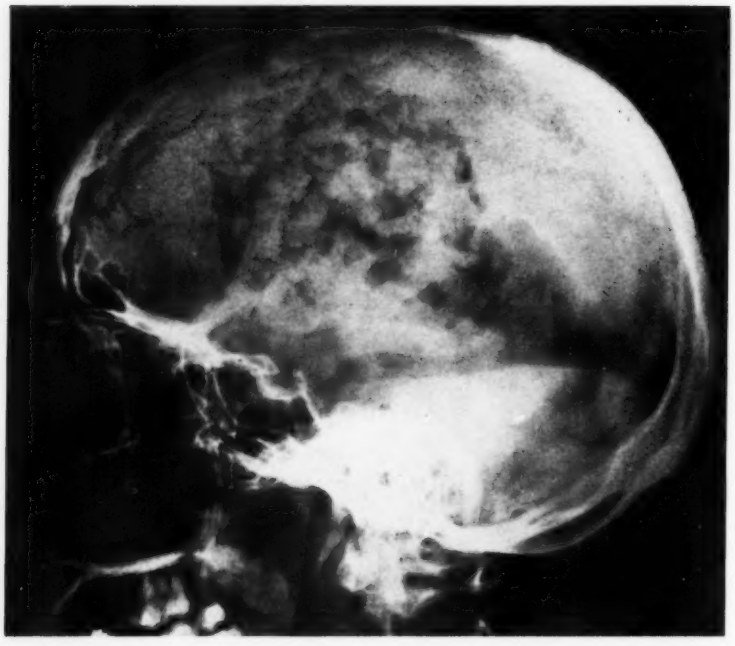


Fig. 5. Right lateral view. The temporal and occipital horns on the left are well shown, as are the accordion-like pleats of the tumour. Note the normal sella turcica.

moved. When the removal was seemingly complete, both lateral ventricles, both choroid plexuses, and the entire third ventricle were completely exposed. No corpus callosum was identified at any time. During the course of the operation it was necessary to clip several large cortical veins on the left side as they entered the median longitudinal sinus, as well as a rather large artery on the mesial surface of the brain.

The patient stood the operation well, but the postoperative course was exceedingly stormy. Consciousness did not return for days, and the picture was not unlike that of decerebrate rigidity. Gradually the decerebrate posture improved, but never entirely cleared. The patient did not speak until Feb. 27, 1945. She was discharged on March 17, by which time there was some voluntary movement of all her limbs, but spasticity was pronounced and there were some contractures. Her speech by this time was clear and distinct, and mentally she was quite alert. She died shortly after leaving the hospital.

The pathological examination of the tumour showed it to be a typical pearly tumour, an epidermoid (cholesteatoma).

SUMMARY

Intraventricular epidermoids produce characteristic pneumographic deformities so that preoperative diagnosis is easy. A huge intraventricular epidermoid with typical findings is reported.

Medical Arts Building
Winnipeg, Manitoba, Canada

REFERENCES

1. KRIEG, W.: Aseptische Meningitis nach Operation von Cholesteatomen des Gehirns. Zentralbl. f. Neurochir. **1**: 79–86, October 1936.

2. DYKE, C. G., AND DAVIDOFF, L. M.: Encephalographic Appearance of Intraventricular Epidermoid. Bull. Neurol. Inst., N. Y., **6**: 489–493, December 1937.

3. DYKE, C. G.: in Golden's Diagnostic Roentgenology, New York, Thomas Nelson & Sons, 1941.

4. WEINBERGER, L. M.: Intracerebral Epidermoid Tumours—Characteristic Encephalographic Finding. J. Mt. Sinai Hosp. **5**: 565–572, Nov.-Dec. 1938.

5. PEYTON, W. T., AND BAKER, A. B.: Epidermoid, Dermoid and Teratomatous Tumors of Central Nervous System. Arch. Neurol. & Psychiat. **47**: 890–917, June 1942.

An Unusual Roentgen Shadow in Chloroma[1]

J. MAXEY DELL, JR., M.D.
Gainesville, Fla.

THE CLOSE correlation between the roentgen and autopsy findings prompted the report of the following case.

A colored male, 28 years old, was admitted to the hospital with evidence of a debilitating disease and was referred to the Department of Roentgenology for examination of the sternum. Films showed a destructive process in the inferior segment of the gladiolus. A biopsy had been performed at this point several weeks previously, but the destruction was too extensive to be the result of that procedure. A shadow of unusual clarity was observed adjacent to and merging with the bodies of the thoracic vertebrae (Fig. 1). This density was localized by fluoroscopy and oblique films in the posterior portion of the mediastinum. A soft-tissue mass was demonstrable anterior to the defect. These findings suggested tuberculosis as the etiological factor.

Fig. 1. Roentgenogram showing shadow adjacent to and merging with the bodies of the thoracic vertebrae. (Photo by U. S. Army Signal Corps.)

Fig. 2. Lateral view showing soft-tissue mass of fairly uniform thickness behind the sternum.

In this department oblique films of the sternum are made with a long exposure time with the patient breathing. The respiratory motion results in a blurring of the lung, mediastinal, and rib detail, but the significance of this was not appreciated at the time of this study.

Roentgen examination of the spine, long bones, and skull revealed no abnormalities. A lateral film of the sternum showed behind it a soft-tissue shadow of fairly uniform thickness (Fig. 2).

After rather extensive laboratory studies, a clinical diagnosis of monocytic leukemia was made. Details of the history, physical examination, and laboratory findings need not be recounted here, as they contribute nothing to the primary purpose of the report, namely, the analysis of an unusual roentgen shadow.

The patient expired in a few weeks. Autopsy revealed massive infiltration of the periosteum of the sternum, ribs, and vertebrae, the parietal pleura, and the thoracic and periaortic lymph nodes by a greenish tumor tissue, with lesser infiltrations of the

[1] Accepted for publication in December 1945.

heart, lungs, liver, spleen, kidneys, prostate, skin, stomach, appendix, and numerous areas in the muscles and interstitial tissues. The thoracic vertebral bodies were encased in this tumor tissue, which gave the appearance of candle drippings. All of the tumor tissue was composed of solid masses of closely packed large mononuclear cells supported by a minimum of stroma.

Pathological Diagnosis: Chloroma in a case of monocytic leukemia.

COMMENT

1. In this case, if the blurring effect of respiration is properly evaluated, the roentgen diagnosis of a tuberculous process was illogical. Respiratory movement will blur all mediastinal shadows to some extent, even the shadow of the barium-filled esophagus. The long exposure time is enough to allow pulsation to blur any vascular shadow. It would be unusual for a cold abscess to be present without involvement of the vertebrae. With these facts in mind, the following statements appear logical.

(*a*) The density is very close to and connected with the vertebrae, which act as anchoring points.

(*b*) Mediastinal masses due to tumor, enlarged lymph nodes, aneurysm, etc., could not produce a sharply defined shadow with the technic employed.

(*c*) A cold abscess would be unlikely without changes in the vertebral bodies.

CONCLUSION

This unusual shadow was proved by autopsy to have been produced by tumor tissue encasing the spine. It is hoped that this report will allow proper evaluation of future shadows of this nature.

333 West Main St.
Gainesville, Fla.

The Range of Usefulness of Intravenous Pyelography[1]

LEONARD A. MYERS[2]
Houston, Texas

SINCE 1929, when von Lichtenberg and his associates introduced the practice of clinical excretory urography, it has steadily progressed in usefulness. It has been most interesting to read over some of our earlier reports of this type of examination and to observe the widening scope of the procedure throughout the subsequent years.

During the first few years, the most rapid development was in the examination of young children. This was due largely to the difficulty of instrumentation and also to the fact that our sphere of interpretation was still limited to the more gross pathological and anomalous findings. With further refinement of contrast media and improvement in the preparation of the patient, plus correlation of the clinical pathology and functional physiology, the field of usefulness of this procedure has rapidly widened.

During the first five years, we used in our laboratories all the different media, with varying success and not too few untoward side effects. Since 1935, we have used only diodrast, and because of its low toxicity and absence of irritative action on the tissues, we have been able to direct our chief attention toward its useful application rather than to avoidance of unfavorable reactions. Patients and co-workers, also, are less reluctant to accept or request examination with this medium. From 1935 to 1945, 1,515 examinations were made, with no deaths attributable to the procedure. We have taken a fairly careful history as to asthmatic attacks, hay fever, urticaria, and anginoid pains, and in all suspicious cases, and a fair percentage of others, have given a trial injection of 3.0 to 5.0 c.c. into the vein. If after five minutes no reaction ensued, the injection was completed. We have not failed to complete the injection in a single instance.

Preparation of the Patient: The preparation of the patient has been fairly well standardized in printed forms, requiring only minor changes in the amount of laxative to be used and the time of its administration. The purpose of the preparation is to dehydrate the patient, to cleanse and "de-gas" the intestinal tract. The laxative effect must be timed as nearly as possible so that only a short interval will occur between purgation and examination, as otherwise gas will reform in the intestine. The laxative used is compound licorice powder, and instructions are given for the limitation of fluid intake over a period of twelve to sixteen hours preceding the examination.

Procedure of Examination: The following procedure is used routinely and is applicable in all but a small percentage of cases. After a satisfactory scout film is obtained, the injection is made, rarely with more than 20 c.c. of the 35 per cent iodized medium. Exceptions are very obese persons, weighing 200 pounds or more. In our experience, concentration of the urine by dehydration of the patient has been more effective than the use of large amounts of the contrast substance. In only the extremely heavy patient is as much as 30 c.c. given, and even then there is no set rule of ratio of volume to weight.

The first five minutes will normally determine the functional thrust of the kidneys. The more normal the function, the faster the clearance. In children, the period of maximum concentration is at the five-minute interval. In adults up to fifty years of age, the normal period of maximum

[1] Read by title at the Thirty-first Annual Meeting of the Radiological Society of North America, Chicago, Ill., Nov. 8-9, 1945.

[2] Deceased.

concentration is found at about fifteen minutes, while in the aged it is usually later.

Observations: Pathological alterations in clearance are of three types:

(1) *Acute mechanical suppression,* such as is found in ureteral stone obstruction. In the presence of obstruction of this type, the renal parenchyma shows considerably more concentration of the medium than does the unobstructed kidney. There is no associated cortical thinning of the affected side, nor any compensatory hypertrophy of the unaffected kidney.

(2) *Chronic mechanical obstruction,* such as may be found in the presence of long-standing ureteral stones, anomalous vessels at or near the ureteropelvic junction, or tumors causing pressure and thereby interfering with drainage, diffuse lipomatosis of the kidney hilus, and primary ureteral lesions. In chronic obstruction, the functional thrust of the affected kidney may be delayed for one or more hours in advanced cases, and there will be more or less cortical thinning associated with varying degrees of pelvic dilatation. In advanced cases the cortex will be but a few millimeters in thickness, as compared with a thickness in the adult of 2.0 cm. when the measurements are taken from the cups of the calices to the peripheral margin (the tube distance being 36 inches). There will also be found compensatory hypertrophy of the cortex of the opposite kidney, as well as compensatory function, in patients not having nephritic disease.

(3) *Nephritic involvement without mechanical obstructive uropathy.* In this condition there will be poor concentration on both sides throughout a long period of clearance, without ureteropelvic distention. This finding may, however, be unilateral, constituting an etiological Goldblatt syndrome of hypertension.

At the period of maximum thrust, which usually is at the fifteen-minute interval, bilateral ureteral compression is made over the sacroiliac areas by means of tightly folded pillow slips and a strong compression band. The folded pillow slips are arranged, one on either side, with a two-finger-width space between them in the mid-line. Compression is maintained for five minutes, at the end of which time we usually find the proximal half of each ureter and the pelvis and calices of each kidney filled to distention if no organic lesion is present. The presence of a diffuse or localized pyelonephritis will be evidenced by lack of distensibility, and there may be other, more advanced defects, depending upon the type and stage of the lesion. The early discovery of pyelonephritis, before destructive changes have ensued or calculi have formed, is of the utmost importance.

Ureteral Study: During ureteral compression, a complete study of the ureters usually may be made. Detection of ureteropelvic deformities, with evidence of some pelvic stasis, would suggest the advisability of a standing film to determine the possibility of a fixation point at or near the ureteropelvic juncture; not infrequently an anomalous vessel is found. Ureteral kinks and unusual excursion of the kidneys not producing a disturbance in drainage are not considered pathological by our associated urologists. Such anomalies as megalo-ureter, double ureter, and ectopic kidneys, are usually effectively studied at this interval. With sudden release of the compression, the distal portions of the ureters are usually well filled immediately, but the filling may be delayed 20 to 40 seconds, depending on the muscle tone of the pelves and ureters. When there is evidence of flaccidity during the examination, a longer interval should be allowed before taking the distal ureteral film or films. With the distal ureters well filled, pelvic relationships may be studied. Intrinsic ureteral disease may be found, as ureterocele and other primary lesions.

The Bladder: Except in those cases with very poor kidney function or very high fluid level in the body, a diagnostic cystogram is obtained. When multiple positions —anteroposterior, postero-anterior, and right and left latero-oblique—are employed, information furnished by the intravenous method is as accurate as that obtained by

the retrograde cystographic procedure. Diverticula of the bladder, abnormal prostatic indenture, and intrinsic lesions of the bladder wall may be revealed. By having the male patient void, the presence or absence of retention may be determined.

CONCLUSION

Diligent application of excretory urography may permit a wide scope of interpretation of kidney and bladder lesions. The requirements are (1) careful preparation of the patient; (2) individualized attention to the functional status of both kidneys; (3) production of proper ureteral compression at the period of maximum clearance thrust, with cortical measurements of both the normal and affected sides to aid in evaluating and differentiating the acute from the chronic uropathies; (4) a more complete ureteral study; (5) use of a concentrated medium for cystography.

602 Lamar Ave.
Houston 2, Texas

REFERENCES

NOWELL, S.: Increasing Density of Renal Shadow During Excretion Urography; Sign of Acute Ureteric Obstruction. Brit. J. Radiol. **14:** 138–143, 1941.

VON LICHTENBERG, A., AND SWICK, M.: Klinische Prüfung des Uroselectans. Klin. Wchnschr. **8:** 2089–2091, 1929. Abst. in Radiology **15:** 172, 1930.

LOWSLEY, O. S.: New Method of Outlining the Urinary Tract by Means of Uroselectan Injected Intravenously. New York State J. Med. **32:** 1292–1295, 1932.

VON LICHTENBERG, A.: Intravenous Pyelography. Radiology **15:** 664–669, 1930.

VON LICHTENBERG, A.: Principles and New Advances in Excretion Urography. Brit. J. Urol. **3:** 119–165, 1931.

HEROTAGE, K., AND WARD, R. O.: Excretion Urography; Preliminary Note on a New Method of Radiological Demonstration of the Urinary Tract. Brit. M. J. **1:** 734–737, 1930.

BINZ, A.: Chemistry of Uroselectan. Brit. J. Urol. **2:** 348–351, 1930. Also in J. Urol. **25:** 297–309, 1931.

PENDERGRASS, E. P.: Excretory Urography as a Test of Urinary Tract Function. Radiology **40:** 223–246, 1943.

SWICK, M.: Intravenous Urography by Means of Uroselectan. Am. J. Surg. **8:** 405–414, 1930.

NICHOLS, B. H.: Excretory Urography. Editorial. Radiology **29:** 632–633, 1937.

PRIESTLEY, J. B.: Excretory Urography. Radiology **28:** 559–564, 1937.

CUMMING, R. E., AND CHITTENDEN, G. E.: Intravenous and Retrograde Urography; Comparative Study. J. A. M. A. **106:** 602–606, 1936.

BOWEN, J. A., AND SHIFLETT, E. L.: Intravenous Urography in the Upright Position. Radiology **36:** 672–675, 1941.

Ossification of Auricles of External Ears Associated with Acromegaly[1]

LOUIS NATHANSON, M.D., M.Sc. (Med.), and SAMUEL LOSNER, M.D.
Brooklyn, N. Y.

In 1931, J. Erdheim (4) first showed that the cartilage in acromegaly undergoes changes of both a proliferative and degenerative nature. The examples cited in his study are the cartilages of the ribs and vertebrae. The pathological process consisted of an increase in cartilaginous cells and intercellular substance, leading to a distention of the transitional zone between bone and cartilage. Proliferation was followed by degeneration with liquefaction and formation of vacuoles which were filled with deficient cartilaginous tissue. Later, ossification took place with or without previous calcification.

According to Erdheim, this process of calcification and ossification may take place in the ribs and intervertebral disks in acromegaly. Another localization of these proliferative and degenerative changes in the cartilage of acromegalics was observed by H. v. Meyenburg (5), namely, the trachea and larynx. To his knowledge, his was the first such report.

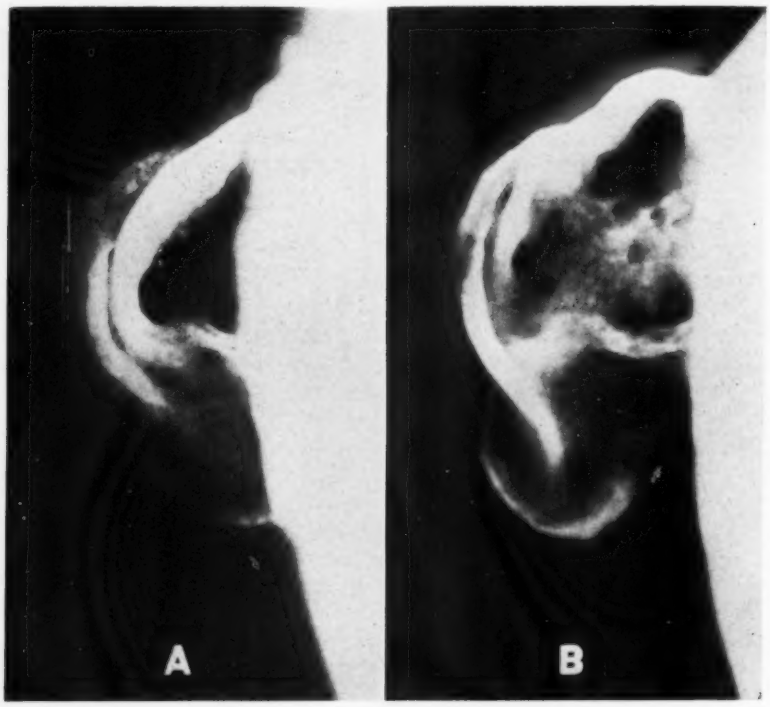


Fig. 1. Ossification of the auricles of both ears. A. Right ear. B. Left ear.

Experimental evidence of the action of anterior pituitary extract of cattle upon the articular cartilage of guinea-pigs was published by Silberberg in 1936 (6). He produced what he called an "acromegalic arthropathy." Hypertrophy and hyper-

[1] From the Department of Radiology, Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn N. Y. Accepted for publication in December 1945.

plasia started in the transitional zone of the cartilage, and areas of liquefaction subsequently developed. This was at times followed by calcification. When calcification did not occur, the areas of liquefaction broke down and ulcerated.

To the above known localizations of calcification and ossification occurring in acromegaly, we wish to add a report of similar involvement of the auricles of the external ear in a long-standing case.

At the present time physical examination reveals a typical acromegalic facies, kyphosis, and spade-like hands and feet. General motor weakness is a prominent symptom; the skin is pale, and hair is absent from the chest, abdomen, and axilla. The voice is slow, indistinct, and high-pitched. The supraorbital ridges are prominent; the eyebrows are almost absent and the palpebral fissures are narrow and slit-like. Examination of the eyes reveals bilateral cataracts. The lips are thick and bulging, and the mouth and tongue are enormously enlarged. The ears are likewise enlarged, displaced upward and backward, and are rigid. The chest is barrel-

Fig. 2. Roentgenogram of skull, showing enlarged sinuses, thickened tables, and protruding mandible. The sella is not enlarged.

CASE REPORT

B. R., a 63-year-old textile dealer, first exhibited symptoms of acromegaly thirty years ago, when he noticed that his hands were becoming gradually larger and his facial features distorted. He consulted Dr. Harvey Cushing, and a definite diagnosis of acromegaly was made. Surgery was suggested but refused. The patient subsequently received a course of radiation therapy to the pituitary gland at the Post Graduate Hospital in New York. He was then able to continue with his work for the following fifteen years, although symptoms became more pronounced.

shaped, and there is a marked kyphosis. The angle of Ludwig measures about 90 degrees. The heart, lungs, and abdomen appear normal. Both hands and feet show typical acromegalic enlargement, with spade-like deformities. There is limitation of motion in both hips on rotation and abduction. Both knees show a diffuse round swelling, with extreme pain on attempts at extension. Both legs are kept in flexion at about 90 degrees.

In addition to the advanced evidence of acromegaly as manifested by marked enlargement of the sinuses, protuberance of the mandible, the spade-like hands and feet, etc., roentgen study of this patient

Fig. 3. Spade-like hands with tufting. The feet were similarly involved.

demonstrated the unusual finding of calcification or ossification of both external ears. The finding was similar on both sides, and the entire cartilage was apparently involved. The roentgenograms of the external ears were readily obtained because of the rigidity of the auriculae and the manner in which they extended from the skull.

It is our impression that the findings in this case indicate ossification rather than calcification, because of the trabeculated structure present. The ossification occurred in a way to differentiate clearly the individual portions of the cartilage of the auricula. The cartilage normally consists of a single piece and gives form to the ear, and upon its surface are found the eminences and depressions which we recognize as the normal ear contour. Cartilage is normally absent from the lobule. The roentgenograms demonstrate the various portions of the cartilage clearly. The rim of the helix and antihelix, the fossa triangularis, and concha are clearly outlined. It is our impression that the entire cartilage on both sides is ossified. The lobule of the ear, where no cartilage is present, is uninvolved.

SUMMARY

A case is presented to demonstrate ossification of both external ears associated with advanced acromegaly.

700 Ocean Ave.
Brooklyn 26, N. Y.

REFERENCES

1. ATKINSON, F. R. B.: Acromegaly. London, John Bale Sons & Danielsson, 1932.
2. ATKINSON, F. R. B.: Acromegaly, from a Study of the Literature 1931–1934. Endokrinologie **17:** 308–320, 1936.
3. ATKINSON, F. R. B.: Acromegaly, Description of Papers Reported in 1935, 1936, 1937. Endokrinologie **20:** 245–257, 1938.
4. ERDHEIM, J.: Ueber Wirbelsäulenveränderungen bei Akromegalie. Virchows Arch. f. path. Anat. **281:** 197–296, 1931.
5. VON MEYENBURG, H.: Ueber chondrogene Skeletterkrankungen. Schweiz. med. Wchnschr. **68:** 57–61, 1938.
6. SILBERBERG, M.: Effect of Cattle Anterior Pituitary Extract on Bone and Cartilage of Joint (Acromegalic Arthropathia). Proc. Soc. Exper. Biol. & Med. **34:** 333–334, 1936.

EDITORIAL

The Thirty-Second Annual Meeting

The Scientific Program

Something like a tidal wave swept into the Palmer House, Chicago, the first week in December, when over 1,400 radiologists and 237 exhibitors and speakers assembled for the Thirty-second Annual Meeting of the Radiological Society of North America. The Program Committee, whose job is never an easy one, deserves the highest praise for the fine scientific sessions that they arranged. It is doubtful if a program containing so many significant papers has been presented since the earliest days of the development of Radiology.

After a cordial welcome from Dr. Robert S. Berghoff, President of the Illinois State Medical Society, the formal program opened on Monday morning, Dec. 2, with a prophetic note. The President's address, "Radiology and the Future," was given by Lowell Goin in his own polished and inimitable style. He sounded a warning and offered good advice about the future developments in economic and social conditions of radiologic practice. His words should be heeded, for there is none who understands the problems better than he, or is more competent to meet them.

The rest of the first day was devoted to a masterly symposium on the Plutonium Project, presided over by Austin M. Brues, Director of the Argonne National Laboratory and Associate Professor of Medicine, University of Chicago. The speakers came from Maryland to California. Their subjects ranged from a description of the pile to the histologic changes following irradiation. While much of the material was beyond the grasp of many of us in the audience, a little knowledge filtered in to form a foundation for future growth. The importance of this symposium is great, for it presented a mass of biological and physical facts from a new source that is undoubtedly going to change our methods of practice, our knowledge of physiology, and no doubt our daily lives. This, the first lesson, while it sounded hard as it came over the microphone, should be invaluable when we have a chance to study the papers as they are published.

A fitting climax to the day came at the Membership Dinner, when the Gold Medal of the Society, awarded for the first time since 1941, was presented to Robert S. Stone for his work on the atom bomb project and its application to medicine. As Chief of the Health Division of the MED project, for the Manhattan Engineer District, Army Service Forces, Dr. Stone was in charge of essential research and investigations of the radiation hazards involved in the operation of the entire project.

Some of the fission products of Monday's program scattered over into succeeding days. Of particular importance was a paper on the "Application of Radioactive Isotopes to a Study of Radiation Effects in Cells," by Martin D. Kamen, Ph.D. This paper will require careful study, with, as the discussants pointed out, a dictionary at hand. Other high lights of the second day were two papers on catheterization of the heart by Merrill Sosman and L. Dexter, presenting for the first time to radiologists this valuable means of study in the physiology and diagnosis of congenital heart disease.

The Therapy Section on the second day was treated to a panel discussion and round table forum on the subject of Carcinoma of the Cervix, a beautifully integrated performance presided over by Edwin Ernst. The sense of this symposium was that the treatment is still in a state that permits

improvement. Early diagnosis and early treatment are important. The method to be used depends upon the skill available; that combination of methods which can be administered with the greatest understanding and experience will produce the best results.

The Carman Lecture was delivered Tuesday evening by Robert R. Newell, who took as his subject "The Quality of Radiation in Therapy." Dr. Newell mixed physics and humor in a manner both informative and amusing, demonstrating by the high scientific quality of his contribution and his sparkling wit that the choice of lecturer had indeed been well made.

Following Dr. Newell came an unscheduled presentation, moving pictures of the Bikini bomb test, with some slides and significant remarks by Col. Stafford Warren and Col. James Cooney. This was a sobering experience. We cannot but be grateful for this chance to visualize more clearly the awesome potentialities of the bomb, and to realize more fully that the possibilities of destruction are as great if not greater than the scientific promise offered by the research that produced it.

The evening closed with a delightful party, at which we were the guests of the Chicago Roentgen Society.

Wednesday we settled down to more familiar things. Among the excellent papers on that day were "Experimental Clostridial Infections in Dogs," by Andrew H. Dowdy, and "Thoracic Angiography," by Dr. Carlos Gomez del Campo and Dr. Jorge Meneses, of Mexico City. An interesting symposium was presented in the Therapy Section on the "Care of Advanced Cancer Patients," presided over by Herbert H. Murphy of Victoria, British Columbia.

Thursday produced many important papers, starting off with "Medical, Biological and Industrial Applications of Monochromatic Radiography and Microradiography," by George L. Clark, Ph.D., of the University of Illinois. Another paper opening up for us new possibilities was "Development of the Betatron for Electron Therapy," by L. S. Skaggs, G. M. Almy, D. W. Kerst, and L. H. Lanzl, of the University of Illinois. Two further special papers appeared, one by Dr. Nils Westermark, of Stockholm, Sweden, on "The Importance of Alveolar Pressure in Diagnosis of Pulmonary Disease;" and the other by Dr. Leonardo Guzman, of Santiago, Chile, on "Cancer of the Thyroid." Another of the newer diseases was offered for us to worry about by David V. LeMone, Wendell G. Scott, Sherwood Moore, and Capt. A. Link Koven, "Bagasse Disease of the Lungs."

New material was not exhausted by Friday. On the diagnostic side we heard about "Studies of Tetraiodophthalimidoethanol as a Medium for Gastro-Intestinal Visualization," from G. E. Jones, W. E. Chalecke, J. Dec, J. Schilling, H. D. Robertson, G. H. Ramsey, and W. H. Strain, of Rochester, N. Y.; next "Studies on Emulsions of Ethyl Iodophenylundecylate as Media for the Visualization of Body Cavities," also from the Rochester group—W. E. Chalecke, G. E. Jones, M. P. George, E. B. Mahoney and W. H. Strain; and another by John Caffey, "Infantile Cortical Hyperostoses: A New Syndrome." Two fine symposia were presented on the last day, one on diseases of the chest, presided over by L. Henry Garland, who at the Banquet on Thursday evening had been named the President-Elect of the Society; the other on the roentgen diagnosis and treatment of bursitis and arthritis, under the guidance of Ernst Pohle.

This report by no means catalogues all the fine papers that were presented. Only the highest of many high spots have been touched. There was no essayist who did not offer something well worth listening to. These papers, as they appear in RADIOLOGY, are going to make fine reading, so plan to take time in the coming months to study your journal, not just read it.

Not only was the scientific content of this meeting unusually high, but great pleasure was enjoyed by everyone in seeing old friends and renewing acquaintances after the lean war years with their restrictions upon such gatherings.

SYDNEY J. HAWLEY, M.D.

DR. ROBERT S. STONE

Recipient of the Gold Medal of the Radiological Society of North America, 1946

In awarding the Gold Medal, Dr. Lowell S. Goin, President of the Society, said in part: "Dr. Stone, Director for Health of the Plutonium Project, had the complete responsibility for the health of all persons employed in this gigantic undertaking . . . . and not only for these but for all those who lived in the immediate vicinity and for those who lived on tributary waters in areas where the reacting piles were located . . . . Because Dr. Stone is a student and a scholar, because he is a wise man and an experienced clinician, he was able to serve the Government and the people in this tremendously important capacity and in so doing he has reflected glory upon every one of us, he has added to the prestige of our profession, he has notably increased the stature of radiology."

The Scientific Exhibits

The thirty-two scientific exhibits entered at the meeting of the Radiological Society of North America, in Chicago, may be classified under the headings of Bones, Chest, Gastro-Intestinal Tract, Genito-Urinary System, Therapy, and Miscellaneous.

There were six exhibits having to do with the skeletal system:

NORMAN HEILBRUN, M.D. (*Buffalo, N. Y.*), WM. G. KUHN, M.D. (*Boston, Mass.*), ARTHUR B. SOULE, JR. (*Burlington, Vt.*), AND SAMUEL L. MELTZER (*Portsmouth, Ohio*): Erosive Bone Lesions and Soft Tissue Ossifications Associated with Spinal Cord Injuries (Paraplegia). This exhibit, which received honorable mention, demonstrated calcifications occurring in the soft tissues of paraplegic patients and extensive erosions in the bones associated with decubitus sores of the trochanters.

JOHN F. HOLT, M.D. (*University of Michigan, Ann Arbor, Mich.*): A Roentgenographic Review of Interesting Skull Lesions. Dr. Holt showed a collection of skull roentgenograms from the files of the University of Michigan Hospital. Some fairly common lesions were shown, and some distinct oddities.

RAYMOND W. LEWIS, M.D. (*Hospital for Special Surgery, New York City*): Roentgen Ray Diagnosis of Pigmented Villonodular Synovitis and Synovial Sarcoma of the Knee Joint. The pathology of villonodular synovitis was demonstrated in this exhibit. Roentgenograms of proved cases and others of synovial sarcoma indistinguishable from villonodular synovitis were shown. Three cases of synovial sarcoma which could be differentiated from villonodular synovitis were demonstrated.

J. E. LOFSTROM, M.D., J. E. WEBSTER, M.D., AND E. S. GURDJIAN, M.D. (*Wayne University, St. Mary's Hospital, and Grace Hospital, Detroit, Mich.*): Penetrating Cranial Wounds. A collection of x-ray reductions demonstrated various types of penetrating wounds of the cranium, together with the operative treatment in each case. A large number of plates illustrating pneumoencephalographic findings at various stages of progress of the cases and colored photographs of the patients were included. Third award was given to this exhibit.

ROBERT J. REEVES, M.D., LENNOX BAKER, M.D., AND DAVID MCCULLOCH, M.D. (*Duke University, Durham, N. C.*): Radiation Therapy and Orthopedic Care in Marie-Strümpell Arthritis. The orthopedic and radiotherapeutic care of patients with Marie-Strumpell arthritis and follow-up results were demonstrated in this exhibit. Case reports were presented in the form of appropriately captioned films and photographs.

GEORGE M. WYATT, M.D. (*Radiological Clinic of Drs. Groover, Christie & Merritt, Washington, D. C.*) AND W. S. RANDALL, M.D. (*Watts Hospital, Durham, N. C.*): Benign and Malignant Lesions of Bone: Radiological and Pathological Correlation. This exhibit consisted of lantern slides showing the roentgenological changes seen in various types of benign and malignant lesions of bone and the correlated gross and microscopic pathologic changes.

Chest studies were represented by ten exhibits, and to exhibitors in this group went the two first awards.

LEWIS F. DEXTER, M.D., AND MERRILL C. SOSMAN, M.D. (*Peter Bent Brigham Hospital, Boston, Mass.*): Venous Catheterization of the Heart: Clinical and Experimental Observations. This exhibit, which won the first award, was made up of photographs, drawings, and reproductions of films, supplementing papers presented by the authors. A long flexible catheter is inserted in the antecubital vein and passed, under fluoroscopic guidance, through the axillary vein to the superior vena cava and into the heart. From the right auricle it is guided either into the right ventricle and pulmonary artery or into the inferior vena cava and thence into the he-

patic or renal veins. Records of blood pressure in the various heart chambers and of oxygen saturation of the samples removed from these chambers were used in identifying cases of congenital heart disease and selecting certain ones for operation.

IRVING TREIGER, M.D. (*Presbyterian Hospital and University of Illinois, Chicago, Ill.*): Correlative Study of Cardiac Diseases. There were shown in this exhibit a large number of translite films for correlative study of roentgenograms, electrocardiograms, and pathologic specimens in frequently encountered heart conditions, to emphasize the correlative value of various methods of examination in the diagnosis and treatment of cardiovascular disease.

V. W. ARCHER, M.D., GEORGE COOPER, JR., M.D., AND N. ADAIR, M.D. (*University of Virginia Hospital, University, Va.*): Epidemic Lead Poisoning Due to Inhalation. This exhibit demonstrated the x-ray findings in representative cases of lead poisoning from inhalation of lead fumes and in conditions to be considered in the differential diagnosis.

ROBERT P. BARDEN, M.D., AND DAVID A. COOPER, M.D. (*Hospital of the University of Pennsylvania, Philadelphia*): Pulmonary Changes in Certain Conditions Due to Vascular Disease. Reductions of chest films were accompanied by case histories and a few pathologic descriptions of diseases such as periarteritis nodosa, lupus erythematosus, influenza, acute rheumatic fever, arsenical toxemia, and acute nephritis, showing distinctive roentgen patterns. Charts were used to summarize principles. Second award was given to this exhibit.

SABINA DI RIENZO, M.D. (*Cordova, Argentina*): Bronchography. Dr. di Rienzo brought this exhibit from the International Congress in Havana, Cuba, to Chicago by special invitation of Dr. Lowell Goin and Dr. James T. Case. It comprised 132 chest films showing normal and abnormal bronchograms demonstrating a wide range of disease.

JOHN S. BOUSLOG, M.D. (*Denver, Colorado*): Roentgenological Study of Acute Infections in the Respiratory Tract of Children. Reductions of films of the paranasal sinuses, mastoids and chests of children with acute infections of the respiratory tract illustrated the necessity of examination of all divisions of the respiratory system in these young patients.

H. E. HILLEBOE, M.D., AND H. F. A. LONG, (*U. S. Public Health Service, Washington, D. C.*): Miniature Film Mass Radiographic Routine Chest X-ray Examination in General Hospitals. This exhibit demonstrated graphically the application of miniature film routine chest examinations to general hospitals, as advocated by the Tuberculosis Control Division of the U. S. Public Health Service.

E. P. MCNAMEE, M.D., AND J. V. PISCHIERI, M.D. (*Saint Alexis Hospital, Cleveland, Ohio*): Extensive Endothelioma of the Right Pleura. Original films of a striking case of endothelioma of the pleura were shown.

FRANCIS L. SIMONDS, M.D., AND CLYDE C. HARDY, M.D. (*Omaha, Neb.*): Primary Lung Cancer. Reductions of chest films from cases of primary carcinoma of the lung, together with case reports and statistics made up this exhibit. Many variations in chest film findings in primary cancer of the lung were shown.

ARCHIE SHEINMEL, M.D., AND BERNARD ROSWIT, M.D. (*U. S. Veterans Hospital, Bronx, N. Y.*): Primary Cancer of the Lung. A second exhibit on lung cancer consisted of material drawn from a ten-year study of 600 cases treated at a Veterans Hospital, from September 1936 to September 1946. All of the cases presented were proved histologically. A careful analysis of the pathologic physiology was included and the life pattern of the disease was shown. Surgical and radiation results were presented.

Four exhibits concerned primarily the alimentary tract.

AUBREY O. HAMPTON, M.D., MILTON FRIEDMAN, M.D., IRVING B. BRICK, M.D., AND ELLERY M. JAMES, M.D. (*Walter Reed General Hospital, Washington, D. C.*): Radiation Injury and Tolerance Dose of

Normal Stomach. Unique lesions of the stomach, many with ulceration, were demonstrated radiographically in cases of carcinoma of the testis in which retroperitoneal lymph nodes were treated with supervoltage x-rays. Kodachrome photographs and photomicrographs of these cases were shown, as well as the roentgenograms. Information as to tolerance doses was presented.

FRED MONAGHAN, M.D., AND ARTHUR FINKELSTEIN, M.D. (*Graduate Hospital, University of Pennsylvania, Philadelphia*): Complementary Value of Gastroscopy and X-ray Examination. This exhibit demonstrated examples of cases studied by x-ray and by gastroscopy, showing instances in which one or the other or both methods were in error. A classification of the causes of such errors was given. Radiographs, reproductions in color of the gastroscopic pictures, and photographs of specimens were shown.

W. R. SCOTT, M.D., AND G. W. JAEGER, M.D. (*The Niagara Falls Memorial Hospital, Niagara Falls, N. Y.*): Pre-Natal Gallstones. By means of original radiographs and photographs of postmortem specimens, these exhibitors presented the case of an infant born with a gallbladder full of calculi, which ruptured at or shortly after birth.

HARRY M. WEBER, M.D., AND C. A. GOOD, JR., M.D. (*Mayo Clinic, Rochester, Minn.*): Roentgenologic Diagnosis of Meckel's Diverticulum. Reproductions of roentgenograms, charts, and line drawings illustrated the manner in which Meckel's diverticulum is exhibited radiologically.

There was a single exhibit dealing with the male genito-urinary tract and two in the field of gynecology and obstetrics.

MILTON FRIEDMAN, M.D., AND LLOYD G. LEWIS, M.D. (*New York University, New York City*): Testis Tumors. By charts, x-ray films, color photographs, and colored photomicrographs, the exhibitors presented an analysis of 250 cases of carcinoma of the testis seen at Walter Reed General Hospital over a period of four years, covering histogenesis, pathological classification, lymph node distribution, therapeutic management, special methods of depth dose determination, radiation injuries and tolerance doses of normal thoracic and abdominal organs, time-intensity dose studies, prognosis, arrest of advanced disease especially in radioresistant cases, effect of radiation on retroperitoneal nodes, spontaneous disappearance of metastatic lesions, hormone bio-assay, and atypical metastases.

E. P. MCNAMEE, M.D., AND J. V. PISCHIERI, M.D. (*Saint Alexis Hospital, Cleveland, Ohio*): Extra-Uterine Intra-Abdominal Pregnancy. This exhibit demonstrated with roentgenograms and photographs an unusual case of extra-uterine intra-abdominal pregnancy.

EDWIN C. ERNST, M.D. (*Barnard Free Skin and Cancer Hospital, St. Louis, Mo.*): Carcinoma of the Cervix—New Expanding Type of Double Cross-Arm Intravaginal Radium Applicator. Photographs and models were shown of a new expanding type of double cross-arm intravaginal radium applicator, and the use of lucite tubing for intravaginal radiation therapy was demonstrated.

In addition to papers in the classifications given above, there were a number dealing with general therapeutic problems.

WILLIAM E. HOWES, M.D. (*Brooklyn Cancer Institute, Brooklyn, N. Y.*): "Tumor Dose"—Method of Calculation and Charting as Carried Out at Brooklyn Cancer Institute. This exhibit consisted of charts and explanatory material, mounted in order to demonstrate the calculation of tumor dose from the initial stages to the point of charting, as carried out at the Brooklyn Cancer Institute.

LOUIS C. KRESS, M.D., AND WALTER T. MURPHY, M.D. (*Roswell Park Memorial Institute, Buffalo, N. Y.*): Cross-Fire X-ray Technic. The steps necessary in determining proper treatment factors in multiple port x-ray therapy were demonstrated; including physical examination of the patient, review of pathological, endo-

scopic and roentgen material, accurate diagrams of anatomical treatment level, and manipulation of isodose curves to determine number of ports and their angulation and separation, thus determining the total dose to the tumor as well as to adjacent structures.

EDITH H. QUIMBY, D.Sc. (*College of Physicians and Surgeons, Columbia University, New York City*). Dr. Quimby's exhibit consisted of ten large charts which gave the basis for radium dosage expression in roentgens; Paterson and Parker charts for linear, area, and volume dosage with examples; Quimby tables for external, linear, and volume dosage, with examples.

E. D. TROUT AND Z. J. ATLEE (*General Electric X-ray Corporation, Chicago, Ill.*): Low Absorption Roentgen-Ray Measurements from 500 to 1000 Kilovolts. This exhibit was made up of panels on which were mounted a series of experimental x-ray tubes and illuminators for display of transparent prints of absorption data.

The remaining exhibits may be grouped as Miscellaneous.

M. M. ZINNINGER, M.D., AND C. M. BARRETT, M.D. (*University of Cincinnati, Ohio*): A Pathological Study of Total Organs. Large microscopic sections of removed tissue were shown with corresponding roentgenograms of many lesions. The group included total microscopic sections of stomach, bowel, breast, uterus, lung, testes, bladder, and kidney.

SAMUEL BROWN, M.D., AND ARCHIE FINE, M.D. (*Jewish Hospital, Cincinnati, Ohio*): The Diaphragm—A Radiologic Study in Three Dimensions. Roentgenograms of the diaphragm in the anterior and lateral projections were displayed, showing the exact position, shape, and contour of the entire structure under normal and abnormal conditions. The various effects upon the position and shape of the diaphragm of an enlarged liver, spleen, kidneys, and subphrenic abscess were shown, and criteria for their differentiation; also, cases showing lesions above and below the diaphragm and their differentiation, and cases of hernia, their localization with and without barium and their effect upon thoracic and abdominal organs.

A. O. HAMPTON, M.D. (*Veterans Administration, Washington, D. C.*): Opportunities for Radiologists in the Veterans Administration: Architect's sketches of proposed new Veterans Hospitals and a typical lay-out for a thousand-bed hospital were presented. A large placard indicated opportunities for radiologists in the Veterans Administration.

PAUL S. HENSHAW, PH.D. (*Monsanto Chemical Company, Clinton Laboratories, Knoxville, Tenn.*) AND PAUL C. AEBERSOLD, PH.D. (*Isotopes Branch, Research Division, Manhattan District, Oak Ridge, Tenn.*): This exhibit, presented by invitation, consisted of photographs of laboratory animals which had received fairly large doses of radioactive material over a long period of time and had developed abnormal growths, some of which were malignant in character. The source of radiation was P^{32}.

JAMES J. NICKSON, M.D., AND MARGARET J. NICKSON, M.D. (*Argonne National Laboratory, Chicago, Ill.*): A Study of Epithelial Reduction and Skin Capillaries After Radiation. Color film showed blood capillaries and skin damage from radiation. Black and white photographs of these changes, together with wax impressions, were also exhibited. A camera for photographing the capillary changes and one for photographing the hands, together with equipment for making finger ridge impressions, were used for studying the hands of the visiting radiologists.

CLARENCE E. HUFFORD, M.D.

The Commercial Exhibit

The Commercial Exhibit section of the Thirty-Second Annual Meeting of the Radiological Society of North America occupied sixty-eight booth spaces in the exhibit room of the Palmer House, immediately adjacent to the Scientific Exhibit.

Thirty-two concerns were in attendance. This exhibit was the largest in the history of the Society, and formed an interesting and valuable part of the meeting. The courtesy and co-operation shown by all the exhibitors, especially when the lack of proper lighting facilities due to the "brown-out" was considered, was almost more than could be hoped for. When, toward the end of the meeting, it appeared that it might become necessary to dismantle the exhibits in order to move the equipment before the impending freight embargo became effective, all the exhibitors voted to stay until the close of the meeting rather than break up the exhibit. This show of confidence as to the value of the Commercial Exhibit justified the many hours of work on the part of the Commercial Exhibits Committee and the hotel management.

Nearly all the exhibitors have indicated their desire to participate in the meeting next year and several are planning more extensive displays. The committee has on file the names of several firms who were unable to exhibit this year, but who plan to show with us in the future. We therefore expect an even bigger and better exhibit in 1947. As a place to show goods to a select and interested group, and to make new acquaintances and renew old friendships, it would be difficult to find a better location than the commercial exhibit section at the annual meeting of the Radiological Society.

It would take more space than is available to do justice to the individual exhibits. In order, however, to give those who were unable to attend this meeting a little idea of what was to be seen, brief descriptions follow.

Ansco (Binghamton, N. Y.): The Ansco exhibit featured radiographs made on both regular and non-screen types of x-ray film, Ansco color transparencies and printons of medical and general photographic subjects. In addition, a complete line of Ansco cameras and photographic materials was on display. The new Ansco reflex camera, which will be placed on the market within the near future, attracted considerable interest.

Buck X-Ograph Co. (St. Louis, Mo.): The Buck X-Ograph Co. demonstrated its well known line of film processing tanks and accessories. The automatic control of solution temperatures by thermostatic regulation as shown in the Buck set-up interested many visitors. A film pass with interlocking doors and the Buck film dryers attracted much attention.

Canadian Radium & Uranium Corporation (New York 20, N. Y.): Interesting features of the Canadian Radium and Uranium Corporation's display were the new gold-plated monel plaques of half- and full-strength type, the monel nasopharyngeal applicator for the irradiation treatment of hyperplastic lymphoid tissue, made in accordance with the technic of Crowe and Burnam, and radon ointment, the new form of radiation therapy with the alpha rays of radon.

The Coca Cola Co. (Wilmington, Del.): The gaily decorated Coca-Cola refreshment stand acted as a magnet to practically everyone attending the meeting. In fact, many must have accepted its hospitality several times as, believe it or not, approximately 5100 free bottles of this refreshing beverage were served.

F. A. Davis Co. (Philadelphia 3, Penna.): The medical publishers, F. A. Davis Co., featured the new two-volume "Clinical Radiology," edited by George V. Pillmore. Fifty-nine American authorities have contributed to make this work an outstanding achievement of medical publishing. A review of the book has already appeared in RADIOLOGY (**47:** 413, 1946).

Jno. V. Doehren Co. (Chicago, Ill.): The film and print processing Jaco automatic device, designed by Dr. A. R. Hansen, was for the first time presented. It provides temperature control of solutions by running hot, cold, and ice water mixed by a blender and controlled by a thermometer, an easily regulated timer for the developing tank, and quick automatic elevation of films to successive tanks, reducing oxidation. The machine will take a film every 30 to 60 seconds. It is simply operated, automatically or by hand.

E. I. du Pont de Nemours & Co. (Wilmington 98, Del.): The Photo Products Department of E. I. du Pont de Nemours & Co. (Inc.) displayed x-ray films and chemicals, along with Patterson intensifying and fluoroscopic screens. Considerable interest was exhibited by visitors in a new type of chair made of Du Pont polythene plastic, and others of Du Pont nylon plastic, as well as in the company's photographic products. Many of the visitors perhaps did not appreciate that the attractive gray drapes which formed the background were also a Du Pont product.

Eastman Kodak Company (Rochester 4, N. Y.): Features of the exhibit presented by the Medical Division of the Eastman Kodak Co. were the demonstration of "Blue Brand X-ray Film...from the inside out" and "Ektachrome...the new Kodak full-color sheet film that you process yourself." The former, by the ingenious use of white and ultraviolet light, simulated Blue Brand Film in cross section, at high magnification, during exposure to the fluorescent light of intensifying screens and after processing. The Ektachrome display consisted of medical photographs made with the latest addition to the Kodak family of color products. Other sections showed the new white interleaving paper for Kodak x-ray films; the new single-powder Kodak x-ray fixer; radiographs made with Blue Brand and No-Screen x-ray films; full-color photographs made with Kodachrome film.

Eureka X-ray Tube Corporation (Chicago, Ill.): In spite of the lack of lighting facilities due to the "brown-out," the Eureka Co. had an excellent exhibit. Of interest to all is the fact that this company will start full production of rotating anode tubes (after completing two years of field tests) on Jan. 7, 1947. The exhibit included a full line of x-ray tubes, from the smallest dental tube up to a 250-kv. therapy tube.

General Electric X-Ray Corporation (Chicago 4, Ill.): Among the outstanding features of the exhibit by General Electric X-Ray Corporation was a display of skull radiographs of early Indians of British Columbia and South America. Valuable data for studies in dentistry and anatomy are provided by these skulls, as well as links in the chain of our understanding of anthropology.

The company exhibited, for the first time, its new superficial therapy machine and table, whose salient feature is a beryllium-window tube that offers extremely high roentgen output per minute, and a much higher proportion of soft radiation than is possible with glass-window tubes. Rating is from 30 to 100 kv. Demonstration was also given of the operation of the widely known and used Berman locator, for precise localization of magnetic foreign objects in the body, and of the new medical-model Pako automatic film-processing machine, which eliminates all human handling from the processing of x-ray film. This processing machine permits the viewing of wet films at appropriate intervals, materially reduces the total time of processing, and offers other advantages over previous models. Also exhibited was the company's orthostereoscopic viewer for 4×5-inch photoroentgen films and a small illuminator for direct reading.

Thos. B. Gibbs & Co. (Delevan, Wis.): The Thos. B. Gibbs Division of the George W. Borg Corporation was a new exhibitor. Their space attractively demonstrated their new shock-proof combination fluoroscopic and radiographic Bucky tilt table and their "Spartan Mobile" combination mobile and portable 100 per cent shock-proof unit. Their control panel with its positive acting automatic switches and controls attracted much attention.

The Kelley-Koett Mfg. Co. (Covington, Ky.): The Kelley-Koett Manufacturing Company's exhibit featured the Photocron generator, tube, and camera stand along with the Keleket Type "B" motor-driven tilt table and the 500 Vertical Multicron Control. The unit attracting the greatest amount of interest was the Keleket Type "B" tilt table. The Keleket Universal Timer and the Keleket Electric Barium Mixer were new items of much interest.

Lea & Febiger, Publishers (Philadelphia 6, Penna.): Lea & Febiger exhibited the new fourth edition of MacKee and Cipollaro's classic, "X-Rays and Radium in Treatment of Diseases of the Skin," as well as new editions of Davidoff and Dyke's "The Normal Encephalogram" and Wesson's "Urologic Roentgenology." Forthcoming new editions of Pohle's "Clinical Roentgen Therapy" and Holmes and Robbins' "Roentgen Interpretation" were announced. Among general medical reference works, Gray's "Anatomy" and Boyd's "Pathology of Internal Diseases" continued to command interest.

The Liebel-Flarsheim Co. (Cincinnati 2, Ohio): The Liebel-Flarsheim Co. exhibited representative items from their line of precision-built x-ray specialty devices. X-ray timers and stationary filter grids for secondary radiation were featured. As a museum piece, they had on exhibition one of their earliest timers, which still operates with absolute accuracy, in spite of years of hard usage.

Machlett Laboratories (Springdale, Conn.): The complete line of Machlett x-ray tubes was exhibited. A new tube with external beryllium window, for operation at 5 to 50 kv., a new shock-proof 100-kv. tube for under-table fluoroscopy and spot-film radiography, and the two-million-volt precision x-ray tube for use with the Van de Graaff electrostatic generator were high lights of the exhibit.

F. Mattern Mfg. Co. (Chicago 30, Ill.): Displayed at the Mattern booths were the Mattern 200-ma. two-tube unit with rotating anode tube, spot radiographic device, and automatic control; also the increasingly popular Mattern 70-mm. portable chest unit. The popular MX-100-ma. single-tube motor-driven table unit with automatic deluxe push-button control received its full share of attention.

The Medical Bureau (Chicago, Ill.): Miss M. Burneice Larson's Medical Bureau was capably represented, reminding radiologists of its facilities as a counselor in the problems of medical personnel. It has available the records of diplomates of the American Boards, younger physicians interested in obtaining training and, also, of administrators, executive and supervising nurses, scientists, laboratory technicians, x-ray technicians, social workers and dietitians for those interested in the completion or re-organization of their staffs.

The Wm. Meyer Co. (Chicago 2, Ill.): The Wm. Meyer Co., manufacturers of electrical equipment for professional use, presented the Meyer "Head and Specialist Unit," for the production of negatives of the head with the patient seated in a comfortable upright position. Stereoscopic facilities are included, and the rotating parts are fully calibrated for repeating positions. A choice of generators is available for use with this unit.

North American Philips Co. (New York 17, N. Y.): North American Philips Co. exhibited a clever arrangement for miniature radiography which will adequately accommodate either ambulant or stretcher cases. In addition, a contact and cavity therapy apparatus was demonstrated. This compact unit is designed for contact therapy on the skin or in surgically exposed lesions which require treatments of short duration and high intensity. A newly designed diagnostic x-ray unit (200-ma.) was also displayed. Its many features were spot-lighted by a new spot-filming device which is simple in construction and positive in operation.

Picker X-Ray Corporation (New York 10, N. Y.): The Picker X-ray Corporation displayed a number of the units which are available in their "Minograph Line-up" of chest x-ray screening apparatus. This equipment is designed to provide thirty-six different combinations for the use of roentgenologists in consultative group screening and diagnosis and of hospitals in admission and out-patient screening. It includes equipment for large and small group chest surveys and mobile clinics.

Any of the various units in the "Minograph" line may be fitted with either automatic 70-mm. roll-film camera, automatic 70-mm. cut film four shot camera, automatic 4 × 5″ cut-film four shot camera,

or manual 35-mm. roll-film camera. The "Thoragraph" unit for photo-timed 14 × 17" chest radiographs was also displayed.

Professsional Equipment Co. (Chicago 7, Ill.): The Professional Equipment Co., manufacturers of the Profexray, displayed three units—a portable, a mobile, and a combination radiographic and fluoroscopic unit. Particular interest was demonstrated in their light-weight 80-kv. and 20-ma. portable model, which may be used as a portable unit in the patient's home or as an auxiliary to heavier equipment.

Radiology (Detroit 2, Mich.): A "blown-up" cover and contents page of the most recent issue of RADIOLOGY, with some enlarged illustrations grouped around the seal of the Radiological Society, served to remind members and others that this is the official organ of the Radiological Society of North America. Copies of RADIOLOGY, a booklet of "Instructions to Authors," reprints of a symposium on Protection recently published, and other items were to be had for the asking. Copies of the Cumulative Index were also on display.

Radium Chemical Co., Inc. (New York 22, N. Y.): Radium Chemical Company, Inc., displayed its new type, monel metal nasopharyngeal applicator, used in the prevention and treatment of deafness caused by hyperplastic lymphoid tissue. Non-removable all-gold radon implants, the newest types of radium containers, and a complete line of radium and radon accessories were shown.

Rexair, Inc. (Detroit 2, Mich.): These exhibitors describe their product as a "portable air cleaner" that performs many hospital jobs. It purifies, deodorizes, and humidifies the air; cleans floors, walls and furniture; scrubs floors; draws in dust-laden air and sends out clean, moist air.

J. B. Roerig & Co. (Chicago 11, Ill.): The representatives of this company, exhibiting for the first time at a Radiological Society meeting, expressed themselves as surprised and pleased at the interest shown in their products: "Heptuna" for the secondary anemia frequently seen following radiation therapy and for radiation sickness and "Darthronol" which is being used supportively in the arthritides.

Schering Corporation (Bloomfield, N. J.): The Schering exhibit featured, among other drugs, the well known contrast media, Priodax and Neo-Iopax. Dual panels showed x-ray films demonstrating the clearly visualized gallbladder after the administration of Priodax and the uniformly good portrayal of the kidney pelvis, ureters, and bladder obtained with Neo-Iopax intravenously. Also included in the exhibit were the estrogenic preparations Estinyl and Oreton, and Cortate, a desoxycorticosterone recommended for adrenal deficiency states.

Standard X-Ray Co. (Chicago 14, Ill.): The Standard X-Ray Co. exhibited both diagnostic and deep-therapy apparatus. The Console Therapy Control shown with a light enamel finish invited much attention not only because of its attractive appearance but also because of the practical arrangement of the operating and measuring instruments incorporated in the control panel. Many favorable comments were also made about the 220-kilovolt Flexray Therapy Tube Stand and the new Standard 70-mm. miniature film apparatus, so designed that it is practical as a transportable unit or for permanent hospital installation.

The Model F combination radiographic and fluoroscopic motor-driven table was also exhibited, as was the Model MO 500-ma. Master Control Panel, incorporating safety features which make it possible to operate as easily and as safely at 500-ma. loads as it is to make exposures at 5-ma.

The Victoreen Instrument Co. (Cleveland 14, Ohio): The Victoreen Instrument Co. exhibit offered complete coverage, with instruments for measuring dosage and for protection from scattered radiation. Of especial interest was the "Proteximeter," which is designed to measure minute quantites of x-radiation, calibrated directly in milliroentgens with full scale 200 milliroentgens or 0.2 r. Any radiation present is indicated accumulatively.

Westinghouse Electric Corporation (Pittsburgh 30, Penna.): As an example of their

planning service, the Westinghouse Corporation displayed a scale model of the diagnostic wing of a new 1,000-bed Veterans Hospital. Other features of the exhibit were the new motor-driven "Duoflex" x-ray table with four-way spot-film device and the wall-mounted 150-kv. intermediate therapy equipment with associated 150-kv. control mounted on an "Airline" technician's desk. Installed in the back wall of the booth were 150-kv. and 250-kv. therapy controls. Both these, as used with the constant potential transformer unit, had hinged front panels affording easy access to the wiring assembly. Also displayed were 200-ma. semi-automatic and 500-ma. full automatic controls.

Winthrop Chemical Co., Inc. (New York 13, N. Y.): Winthrop Chemical Co., Inc., featured the widely used radiopaque agents—Diodrast, Diodrast Compound, Skiodan. A newly introduced Diodrast Solution for cardioangiography was promoted for the first time.

The Year Book Publishers, Inc. (Chicago 4, Ill.): The Year Book Publishers exhibited a full line of medical books featuring "Radiology for Medical Students" by Hodges, Holt and Lampe and the 1946 "Year Book of Radiology" edited by Waters and Kaplan. The Roentgen Diagnosis Handbooks, including "The Chest" by Rigler, "Osseous System" by Archer, "Gastro-Intestinal Tract" by Hodges, "Urinary Tract" by Kerr, "Arthropathies" by de Lorimier, and Caffey's "Pediatric X-Ray Diagnosis" were displayed. Also offered were Kaplan and Rubenfeld's "Topographic Atlas for X-Ray Therapy," Hilleboe and Morgan's "Mass Radiography of the Chest", and Glasser's "Medical Physics."

York Microstat of Illinois, Inc. (Chicago, Ill.): This organization, using new type equipment and processing technics, invented by W. U. Zeller, Technical Director, produces controlled density recordings of x-ray films. These miniature reproductions on 35-mm. and 70-mm. microfilm are notable for their high fidelity of detail and density values, giving a reproduction apparently identical with the original. The two principal uses of interest to radiologists are: (1) long-term retention of x-ray files, with great reduction of storage space and improved reference convenience; (2) as a better medium for visual instruction. An example of a teaching application was demonstrated by the 35-mm. film strip which recorded a portion of the skull section of the University of Michigan's film library.

W. R. Scott, M.D.

The Refresher Courses

Registrations for the Refresher Courses held in connection with the 1946 meeting of the Radiological Society of North America totalled 679, from 41 states, Illinois leading with 123, followed by New York with 82 and California with 49. Canada, Cuba, Honolulu, Central America, Argentina, and Chile were also represented. The total included members, non-members, residents, and students, with the three latter groups outnumbering the members. There was excellent attendance at all courses, even on the last day of the meeting, when many had already left for home. The approximate total for the thirty courses was 4,550.

Nearly 600 attended the film-reading session, which was ably handled by Drs. Sosman, Camp, and Garland. They were somewhat handicapped, inasmuch as no projectoscope could be obtained, bringing to our attention the necessity of making some changes in the procedure at future sessions. One hitherto unannounced "fact," that lues is rare in California, we are quite sure will interest the Chambers of Commerce of that state. This remark ended this session and added to the humorous ribbing between Boston, Rochester, and San Francisco.

The courses in Gastro-Intestinal Diseases and associated conditions, Sunday through Friday, drew the largest total attendance. These courses were given by Drs. Samuel

Brown, Byrl R. Kirklin, Fay H. Squire, James B. Eyerly, H. C. Breuhaus, G. M. Hass, John M. Dorsey, E. H. Fell, Ross Golden, David G. Pugh, and Leo Rigler.

We wanted to give more time to Chest Diseases, but a limited number of rooms and time prevented, so that we had to be content with only four periods, which we thought should be of special interest. Dr. L. R. Sante discussed the Pneumonias in his usual excellent style. Dr. Laurence L. Robbins received especially favorable comment for his presentation of Segmental Collapse of the Lungs. Dr. L. W. Paul likewise presented a meticulous course on the Clinical and Roentgenologic Aspects of Bronchography, which was greatly enjoyed. Drs. Russell H. Morgan and David M. Gould gave a course on Miniature Chest Films to a small but very interested audience, evoking prolonged discussion.

The three sessions on Bone Pathology, the first given by Drs. John D. Camp and David G. Pugh on Generalized Bone Disease, and the others by Dr. L. Henry Garland on Differential Diagnosis between Arthritis and Attrition, were enthusiastically received by overflow crowds.

Drs. Robert P. Barden, George W. Chamberlin, and P. Boland Hughes presented the sections on Roentgenology of the Urinary Tract. There is a demand every year for this course, and the speakers did their usual thorough and interesting job.

The therapy sessions included as many of the various systems and types of therapy as possible, beginning on Sunday with Dr. Walter Wasson's version of Intravaginal Irradiation. This was followed by a discussion of the Use of Radioactive Isotopes by Drs. B. V. A. Low-Beer and Edward H. Reinhard. These two courses were apparently of special interest both to the Radiation Therapists and the Physicists and served to clarify many points previously not understood.

Our old standbys, Edith H. Quimby and J. L. Weatherwax, helped out with their presentations of Practical Problems in Radium Dosage and X-Ray Measurements.

Dr. Bernard P. Widmann presented a course on Cancer of the Skin; Dr. A. N. Arneson, on Carcinoma of the Female Genital Tract, including a movie of his method of transvaginal irradiation; Dr. Herbert Schmitz discussed When, How and Why Should Carcinoma of the Breast Be Treated; Dr. Milton Friedman, Carcinoma of the Male Genital Tract; Dr. James A. Corscaden, Treatment of the Benign Lesions of the Female Genital Tract; and Dr. Juan A. del Regato gave a two-session course on the Classification, Diagnosis, and Evaluation of the Different Forms of Treatment of Cancer of the Oral Cavity, Pharynx, and Larynx. The diagnosis and treatment of Diseases of the Brain and Spinal Cord were presented by Drs. T. J. Wachowski, A. J. Peterson, Eric Oldberg, Percival Bailey, Paul C. Bucy, and Roger T. Harvey. All of the therapy courses were well attended, and all of those interviewed expressed themselves as very pleased that they had been present.

We were particularly interested in the opinion of the men from the Army and Navy recently returned from service, that all of the courses had been most helpful in renewing their acquaintance with civilian radiology. From the requests and comments, it seems that the Refresher Courses are one of the most popular parts of the meeting, and we hope that we can give many more, equally interesting, for the benefit of the members of the Society and others interested in radiology. It is our impression that these courses occupy a very definite place, doing just what the name implies—refreshing and renewing our knowledge of our specialty.

The Refresher Course Committee wishes to acknowledge the excellent help given by the committee, composed of Drs. T. J. Wachowski, E. E. Barth, B. D. Braun, J. H. Gilmore, B. M. Johnson, and A. J. Peterson, and we would be more than remiss if we did not say an added thank you to Dr. Warren Furey.

KENNETH DAVIS, M.D.
PAUL C. SWENSON, M.D.
C. EDGAR VIRDEN, M.D., *Chairman*

The Second Inter-American Congress of Radiology

Havana, Cuba, Nov. 17–22, 1946

At the combined meeting of the Radiological Society of North America and the American Roentgen Ray Society held in the fall of 1944, Dr. W. Edward Chamberlain, Dr. Pedro L. Farinas, and the writer were named as a committee to represent the Radiological Society of North America in cooperating with the Cuban Society of Radiology in arranging for the Second Inter-American Congress of Radiology. Committees were also named by the American Roentgen Ray Society and American College of Radiology. Because of the overlapping personnel of these committees, they were joined into one general committee for the United States, with the writer as Chairman and Mr. Mac F. Cahal as Secretary.

The First Inter-American Congress of Radiology held in Buenos Aires in 1943, under the Presidency of Dr. José F. Merlo Gómez, had chosen Havana as the site of the Second Inter-American Congress of Radiology, and this automatically made the Cuban Society of Radiology the Committee of Arrangements. The Cuban society, under the Presidency of Dr. Pedro L. Fariñas, included Dr. R. Hernández Begueríe as Secretary-General, Dr. Ernesto Fonts as Treasurer, and Dr. Armando Cabrera and Dr. C. Rodríguez Remus as vocales.

The Society elected Dr. Pedro L. Fariñas as President of the Second Inter-American Congress. Honorary Presidents included the Honorable President of the Republic of Cuba, Dr. Grau San Martin; the Minister of Health and Social Assistance; the Rector of the National University; the Dean of the School of Medicine, and the President of the First Inter-American Congress of Radiology, Dr. José F. Merlo Gómez. Honorary members included the presidents of the societies of radiology of the American continents, the presidents of the medical societies of Cuba, and the Professor of Radiology and Physiotherapy at the National University of Havana, Dr. Manuel Viamonte.

The opening meeting was a picturesque and festive affair, which will be long remembered by all who were present. The Congress was inaugurated by the President of the Cuban Republic, Dr. Grau, in the presence of the diplomatic corps and the delegates to the Congress. Dr. J. F. Merlo Gómez, President of the First Inter-American Congress of Radiology, inducted the new President, Dr. Pedro L. Fariñas, of Havana. Both of these physicians spoke at some length on the international character of the science of radiology and the great satisfaction felt by all at the numerous representations from all of the American countries. More than 650 delegates and members of their families were registered at the meeting. Some of the official delegates of the various countries were introduced, and the writer was then called upon for an address on "Radiology in America." In elaborating upon this subject he chose to pass over the evolution of radiology in the United States and Canada, referring to the numerous publications on the subject in "The Science of Radiology" and in the 1945 anniversary numbers of RADIOLOGY and *The American Journal of Roentgenology and Radium Therapy*, and to the full record of the fifty years of radiological development as shown in the volumes of RADIOLOGY and of *The American Journal of Roentgenology and Radium Therapy*. He then described in some detail the origins and developments of radiology in the principal Latin American countries. His address will be published in full at a later date.

In the following days, Monday to Friday inclusive, the program was carried out with the presentation of eighty-three formal papers and a large and extremely rich collection of radiographic exhibits, comprising the scientific exhibition. The commercial exhibit was a large one, well organized and

very attractive, manned by a large personnel of Spanish-speaking exhibitors, who made the most of the opportunity of meeting so many representatives of radiology from the various countries of the new world.

The social program deserves special mention and an expression of gratitude for the untiring efforts of the local committee of radiologists and their ladies. The program included luncheons for the visitors, a visit to the National Medical College, which corresponds to our American Medical Association, a cocktail party offered to the delegates and their wives by the House of Bacardi, a final banquet at the Vedado-Tennis Club, with typical and interesting entertainment, followed by the grand ball. Finally, on Friday afternoon, there was a luncheon and beach party at the Sevilla-Biltmore Yacht and Country Club, and on Saturday, after the close of the Congress, a country picnic at the Rio Cristal, with a luncheon of various typical Cuban dishes, with delightful entertainment, including a demonstration of the rhumba. During the week a brilliant fashion show was put on for the ladies, as well as sight-seeing tours of Havana. Numerous private entertainments and parties also took place. The delegates will remember with gratitude the hospitality of their charming hosts.

The adjunct-secretaries, Dr. Eduardo Rivero and Dr. Rafael A. Gómez, the Committee Chairmen, Drs. Padrón, González Peña, Raúl Pereiras, Elizondo Martell, and their various committee members all share in our thanks for their efficient work.

Of the eighty-four papers listed in the official program, seventeen were solicited from and contributed by United States delegates. Six papers were contributed by Canada. The remainder were distributed among the other countries represented. There were four principal topics for discussion, to each of which an afternoon session was devoted: (1) *Carcinoma of the Stomach*, which was discussed by Dr. Burlando of Argentina; Dr. Caminha of Brazil; Dr. Daza and his colleagues from Chile; Dr. Rigler from the United States; Dr. Oscar Soto from Peru, and Dr. Codas Thompson of Paraguay.

(2) *Bone tumors* were discussed by Dr. Maissa of Argentina; Dr. Guzman and his associates from Chile; Drs. LeMone and Ackerman from the United States, and Drs. Frangella and Rivas of Uruguay.

(3) *Bronchiogenic carcinoma* was reported upon by Drs. Molinari and Malenchini from Argentina; Drs. Casarino and Mella from Chile, and Dr. Schmidt from the United States.

(4) *Radiological mass investigations* were discussed in a paper sent in by Dr. Morgan and Dr. Hilleboe from the United States; by Dr. Gundelach and his colleagues from Chile, and finally by Dr. Carlos Gómez del Campo from Mexico.

All of these papers will appear in the radiological journals of their respective countries, and it is planned to publish the lot of them in a single volume in the language in which they were given.

Some outstanding papers from our Latin-American colleagues included one on "Infectious Spondylitis," by Dr. S. di Rienzo from Argentina, with numerous beautiful illustrations, including some cases of brucellosis. Dr. G. Esguerra Gómez of Colombia gave an interesting paper on the "Osseous and Articular Lesions of Leprosy," based on a study of 500 cases of this disease in both sexes at various ages. In addition to the papers given in the *ponencias* or discussions on special topics, there were other various excellent contributions on tumors of the stomach, including those by González Peña and Hernández Beguerie of Havana; Sobá of Santo Domingo; Golden and Stout of the United States, and Daza of Chile.

Considerable attention was paid to the roentgen diagnosis of breast lesions, both in males and females. On this subject there was an extensive exhibit by Dr. Felix Leborgne and his colleagues from Montevideo. Another interesting exhibit was that of Dr. Aguirre and his Cuban associates on mastography.

The study of the respiratory passages by contrast me lia was presented in the pro-

gram and in exhibits by di Rienzo of Argentina, Aguirre and his colleagues from Cuba, Eduardo Ribero and Veulens of Cuba. Of special interest was an exhibit on anterior pneumomediastinum and on angiocardiography by our Cuban colleagues, and one on retrograde cavography and aortography by Pereiras and Castellanos.

The sessions on irradiation therapy were extremely interesting, and aroused much comment. It had been the intention of the officers of the Congress to hold simultaneous sessions on diagnosis and therapy, but unavoidable restrictions placed by the hotel upon rooms available for the meetings prevented simultaneous section meetings and made it necessary to have a very long, full program which precluded discussions.

The second evening meeting was a solemn session in commemoration of Roentgen. The principal speakers were Dr. Edith Quimby of New York, who discussed the basic facts relative to atomic energy in an admirable combination of clear, slow diction, lucid presentation, and graphic illustrations which made her address understandable even by the majority of the Latin-Americans present. Dr. G. Esguerra Gómez of Colombia gave a splendid oration on Roentgen, in which he made a special plea for the conservation of the terms "roentgen diagnosis," "roentgen therapy," and "curie therapy," that the names of Roentgen and Curie may not be forgotten. Dr. Leonard Guzman also gave an oration on Roentgen.

Just before this evening meeting, the American College of Radiology in an impressive ceremony, which was very much in place in the "solemn session," bestowed honorary fellowships upon Drs. Fariñas and Viamonte of Havana, Dr. Felix Leborgne of Montevideo, and Dr. J. F. Merlo Gómez of Argentina, and (*in absentia*) upon Dr. Manuel de Abreu of Rio de Janeiro.

At the closing session it was voted to establish an Inter-American College of Radiology, with headquarters in Buenos Aires, where there will be located a permanent secretary. It is the present plan that the officers of the College shall be the officers of the Inter-American Congresses of Radiology, and that the College will be responsible for the conduct of the Inter-American Congresses.

It was voted to hold the next meeting in 1949 in Santiago, Chile. If for any reason the meeting cannot be held in Santiago at that time, Montevideo was named as the alternate location.

There were some defects in the Congress from the standpoint of the English-speaking delegation, especially as to language. It would seem entirely feasible to have less voluminous papers read—papers only so long as could be presented in full at a deliberate rate of reading within the time allotted, and with simultaneous presentation of the English translation on the screen; *vice versa*, it would seem necessary that the English contributions should be presented simultaneously on the screen in Spanish at the moment of reading in the orginal language. Probably nothing will add to the value of the Congresses so much as this simple measure—to have a bilingual presentation, one by voice and one on the screen.

Perhaps it would not be too early to begin planning for attendance at the Santiago meeting and to arrange a tour of the principal South American capitals in connection with the visit to Chile.

JAMES T. CASE, M.D.

RADIOLOGICAL SOCIETY OF NORTH AMERICA

The newly elected officers of the Radiological Society of North America are: President, Frederick W. O'Brien, M.D., Boston; President-Elect, L. Henry Garland, M.D., San Francisco; 1st Vice-President, Ira H. Lockwood, M.D., Kansas City, Mo.; 2d Vice-President, Harold W. Jacox, M.D., Pittsburgh; 3d Vice-President, Robert C. Pendergrass, M.D., Americus, Ga.; Secretary-Treasurer, Donald S. Childs, M.D., Syracuse, N. Y.; Librarian, Howard P. Doub, M.D., Detroit; Member of the Board of Directors, Joseph C. Bell, M.D., Louisville, Ky.

CLINICAL CONFERENCE OF MIDWESTERN RADIOLOGISTS

The Seventh Annual Clinical Conference of Mid-Western Radiologists will be held in Cleveland, at the Statler Hotel, on Friday and Saturday, Feb. 14 and 15, 1947. An excellent program has been arranged, with emphasis on the clinical aspects of radiology. Announcements will be mailed to Mid-Western radiologists in the early part of January.

NEBRASKA RADIOLOGICAL SOCIETY

At the Annual Meeting of the Nebraska Radiological Society held in Omaha, in October, the following officers were elected: Dr. D. A. Dowell, Omaha, President; Dr. O. A. Neely, Lincoln, Secretary-Treasurer.

OKLAHOMA STATE RADIOLOGICAL SOCIETY

The Oklahoma State Radiological Society was organized on Oct. 28, 1946, and the following officers were elected: Dr. J. E. Heatley, Oklahoma City, President; Dr. W. E. Brown, Tulsa, Vice-President; Dr. P. E. Russo, Oklahoma City, Secretary-Treasurer. The Society plans to hold three regular meetings each year.

TRAINING PROGRAMS IN RADIOLOGY

New York Hospital—Memorial Hospital

The Department of Radiology of New York Hospital is announcing a revision in its training program, increasing the total period of training to four years, with the requirement of one year's previous internship. The first year will be served as junior assistant resident at New York Hospital; the first six months of the second year as assistant resident and the second six months as resident at New York Hospital; the third year as resident at Memorial Hospital, six months being spent in x-ray diagnosis and six months in x-ray and radium therapy; the fourth year as assistant radiologist at New York Hospital (a New York State license will be required). The equivalent of six months' training in pathology will be given: four months at New York Hospital and two months at Memorial Hospital. One applicant will be accepted each six months, on Jan. 1 and July 1. The next opening is Jan. 1, 1948.

The Department of Radiology at Memorial Hospital is offering one-year fellowships in radiology to those who have completed their requirements for the American Board of Radiology and desire an additional period of training and study in tumor diagnosis and treatment. One candidate will be accepted every six months, usually on April 1 and Oct. 1. The next opening is Oct. 1, 1947.

Candidates interested in the combined resident's position should communicate with Harold L. Temple, M.D., Radiologist, New York Hospital. Those interested in fellowship appointments should communicate with Robert S. Sherman, M.D., at Memorial Hospital.

UROLOGY AWARD

The American Urological Association offers an award, not to exceed $500, for an essay (or essays) on the result of some clinical or laboratory research in Urology. Competition is limited to urologists who have been in such specific practice for not more than five years and to residents in urology in recognized hospitals.

Full particulars may be obtained from the Secretary, Dr. Thomas D. Moore, 899 Madison Ave., Memphis, Tenn. Essays must be in his hands before May 1, 1947.

Books Received

DIAGNOSTIC ELECTROCARDIOGRAPHIE. By ANDRÉ JOUVE, Médecin des Hôpitaux, and JACQUES SENEZ AND JEAN PIERRON, Chefs de Clinique à la Faculté de Médecine de Marseille. Prféace by Professeur CH. LAUBRY. A volume of 364 pages, with 217 figures and graphs. Published by Masson & Cie, Editeurs, Paris, 1946.

A MANUAL OF TOMOGRAPHY. By M. WEINBREN, B.Sc. (S.A.), M.R.C.S. (Eng.), L.R.C.P. (Lond.), F.F.R. (Lond.), D.M.R.E. (Camb.), Lt. Col. S.A.M.C.; Adviser in Radiology, Union Defence Force; Radiologist, Chamber of Mines Hospital, Johannesburg; Late Radiologist, Queen Mary's Hospital (Roehampton), Ministry of Pensions; Assistant Radiologist, The Middlesex Hospital (London). A volume of 270 pages, with 138 figures comprising 397 illustrations. Published by H. K. Lewis & Co. Ltd., London, 1946. Price 45 s. net.

DIAGNOSIS AND TREATMENT OF MENSTRUAL DISORDERS AND STERILITY. By CHARLES MAZER, M.D., F.A.C.S., Assistant Professor of Gyne-

cology and Obstetrics, Graduate School of Medicine, University of Pennsylvania; Gynecologist to the Mount Sinai Hospital, Philadelphia, and S. LEON ISRAEL, M.D., F.A.C.S., Instructor in Gynecology and Obstetrics, School of Medicine, University of Pennsylvania; Associate Gynecologist to the Mount Sinai Hospital, Philadelphia. A volume of 570 pages, with 108 figures. Published by Paul B. Hoeber, New York. 2nd ed., 1946. Price $7.50.

Book Review

L'UROGRAPHIE INTRAVEINEUSE. By BERNARD FEY AND PIERRE TRUCHOT. A volume of 214 pages, with 242 roentgenograms. Published by Masson et Cie, Paris, 1944. Price 320 fr.

The authors demonstrate that the prediction made in London in 1933 by von Lichtenberg, that "all the advances which had already been realized anatomically by retrograde pyelography could be expected in the field of physiology and physiopathology from intravenous pyelography," has proved to be true. They present their subject in a rigidly logical sequence with a remarkably clear and simple style.

Emptying the bladder immediately before commencing the examination is recommended in order to avoid dilution of the dye in the bladder. Poor results are usually obtained if the specific gravity of the urine is below 1.018. Very little faith is placed in preliminary sensitivity tests for the dye. Only eight deaths were observed in approximately one million examinations in a period of over twelve years. The authors insist on compression of the ureters which, they believe, renders intravenous pyelography as valuable as retrograde pyelography save when morphologic information is primarily required. As a physiologic method wherein the interpretation of results is difficult, excretory pyelography does not yield false information.

The comparative secretion of each kidney or the over-all secretion of both cannot be assayed accurately, as early excretion may occur in one kidney or the other. Furthermore, secretion cannot be fully dissociated from excretion because the chemical and dynamic phenomena are closely interrelated. An excellent study of this interrelationship is presented.

The pathologic physiology in reference to the muscular function in excretion is extensively discussed from static (tonus) and dynamic (contractility) points of view. The tonus may be appreciated by close comparison of the urinary passages, which may appear hypotonic or hypertonic. The volume of the spaces and channels is not a reliable guide. The authors consider kinks in the ureter to indicate hypotonia, not morphologic abnormality. Further, horizontal levels in the calices are considered to be due to urine of different density and suggest retention in hypotonic cavities.

Although intravenous pyelography is not an examination for investigation of the lower urinary tract, it may occasionally supply some information which should not be neglected.

In their detailed review of pathological conditions, nephrography is suggested as the usual sign of chronic nephritis. Such impregnation of the renal parenchyma with the radiopaque material, without outline of the calices, generally indicates impermeability of the renal filter. Intravenous pyelography is not considered dangerous in traumatic lesions of the kidney. In pregnancy, there is normal hypotonia and hypokinesia in 60 to 65 per cent of cases. In the case of tumor or cyst of the kidney, retrograde pyelography is nearly always necessary for control.

It is regrettable in such a valuable monograph that the illustrations are not of the best quality, due chiefly to the presentation of positive prints rather than the negative-phase skiagrams.

RADIOLOGICAL SOCIETIES: SECRETARIES AND MEETING DATES

Editor's Note: Secretaries of state and local radiological societies are requested to cooperate in keeping this section up-to-date by notifying the editor promptly of changes in officers and meeting dates. Address: Howard P. Doub, M.D., The Henry Ford Hospital, Detroit 2, Mich.

UNITED STATES

RADIOLOGICAL SOCIETY OF NORTH AMERICA. *Secretary-Treasurer,* Donald S. Childs, M.D., 607 Medical Arts Bldg., Syracuse 2, N. Y.

AMERICAN RADIUM SOCIETY *Secretary,* Hugh F. Hare, M. D., 605 Commonwealth Ave., Boston 15, Mass.

AMERICAN ROENTGEN RAY SOCIETY. *Secretary,* Harold Dabney Kerr, M.D., Iowa City, Iowa.

AMERICAN COLLEGE OF RADIOLOGY *Secretary,* Mac F. Cahal, 20 N. Wacker Dr., Chicago 6, Ill.

SECTION ON RADIOLOGY, A. M. A. *Secretary,* U. V. Portmann, M.D., Cleveland Clinic, Cleveland 6, Ohio.

Alabama

ALABAMA RADIOLOGICAL SOCIETY. *Secretary-Treasurer,* John Day Peake, M.D., Mobile Infirmary, Mobile. Next meeting at the time and place of the Alabama State Medical Association meeting.

Arkansas

ARKANSAS RADIOLOGICAL SOCIETY. *Secretary,* Fred Hames, M. D., Pine Bluff. Meets every three months and annually at meeting of State Medical Society.

California

CALIFORNIA MEDICAL ASSOCIATION, SECTION ON RADIOLOGY. *Secretary,* D. R. MacColl, M.D., 2007 Wilshire Blvd., Los Angeles 5.

LOS ANGELES COUNTY MEDICAL ASSOCIATION, RADIOLOGICAL SECTION. *Secretary,* Moris Horwitz, M.D., 2009 Wilshire Blvd., Los Angeles 5. Meets second Wednesday of each month at County Society Bldg.

PACIFIC ROENTGEN SOCIETY. *Secretary,* L. Henry Garland, M.D., 450 Sutter St., San Francisco 8. Meets annually with California Medical Association.

SAN DIEGO ROENTGEN SOCIETY. *Secretary,* R. F. Niehaus, M.D., 1831 Fourth Ave., San Diego. Meets first Wednesday of each month.

SAN FRANCISCO RADIOLOGICAL SOCIETY. *Secretary,* Joseph Levitin, M.D., 516 Sutter St., San Francisco 2. Meets monthly on the third Thursday at 7:45 P.M., first six months of the year in Lane Hall, Stanford University Hospital, and second six months in Toland Hall, University of California Hospital.

Colorado

DENVER RADIOLOGICAL CLUB. *Secretary,* Washington C. Huyler, M.D., Mercy Hospital, 1619 Milwaukee, Denver 6. Meets third Friday of each month, at the Colorado School of Medicine and Hospitals.

Connecticut

CONNECTICUT STATE MEDICAL SOCIETY, SECTION ON RADIOLOGY. *Secretary,* Robert M. Lowman, M.D., Grace-New Haven Hospital, Grace Unit, New Haven. Meetings bimonthly, second Thursday.

Florida

FLORIDA RADIOLOGICAL SOCIETY. *Secretary-Treasurer,* Maxey Dell, Jr., M.D., 333 West Main St., S., Gainesville.

Georgia

GEORGIA RADIOLOGICAL SOCIETY. *Secretary-Treasurer* James J. Clark, M.D., 478 Peachtree St., N. E., Atlanta 3. Meets in November and at the annual meeting of State Medical Association.

Illinois

CHICAGO ROENTGEN SOCIETY. *Secretary,* T. J. Wachowski, M.D., 310 Ellis Ave., Wheaton. Meets at the Palmer House, second Thursday of October, November, January, February, March, and April, at 8:00 P.M.

ILLINOIS RADIOLOGICAL SOCIETY. *Secretary-Treasurer,* William DeHollander, M.D., St. Johns' Hospital, Springfield. Meetings quarterly by announcement.

ILLINOIS STATE MEDICAL SOCIETY, SECTION ON RADIOLOGY. *Secretary,* Frank S. Hussey, M.D., 250 East Superior St., Chicago 11.

Indiana

INDIANA ROENTGEN SOCIETY. *Secretary-Treasurer,* J. A. Campbell, M.D., Indiana University Hospitals, Indianapolis 7. Annual meeting in May.

Iowa

IOWA X-RAY CLUB. *Secretary,* Arthur W. Erskine, M.D., 326 Higley Building, Cedar Rapids. Meets during annual session of State Medical Society.

Kentucky

KENTUCKY RADIOLOGICAL SOCIETY. *Secretary-Treasurer,* Sydney E. Johnson, M.D., 101 W. Chestnut St., Louisville.

Louisiana

LOUISIANA RADIOLOGICAL SOCIETY. *Secretary-Treasurer,* Johnson R. Anderson, M.D., No. Louisiana Sanitarium, Shreveport. Meets with State Medical Society.

ORLEANS PARISH RADIOLOGICAL SOCIETY. *Secretary*, Joseph V. Schlosser, M.D., Charity Hospital of Louisiana, New Orleans 13. Meets first Tuesday of each month.

SHREVEPORT RADIOLOGICAL CLUB. *Secretary*, Oscar O. Jones, M.D., 2622 Greenwood Road. Meets monthly September to May, third Wednesday, 7:30 P.M.

Maryland

BALTIMORE CITY MEDICAL SOCIETY, RADIOLOGICAL SECTION. *Secretary*, Charles N. Davidson, M.D., 101 West Read St., Baltimore 1.

Michigan

DETROIT X-RAY AND RADIUM SOCIETY. *Secretary-Treasurer*, E. R. Witwer, M.D., Harper Hospital, Detroit 1. Meetings first Thursday of each month from October to May, at Wayne County Medical Society club rooms.

MICHIGAN ASSOCIATION OF ROENTGENOLOGISTS. *Secretary-Treasurer*, R. B. MacDuff' M.D., 220 Genesee Bank Building, Flint 3.

Minnesota

MINNESOTA RADIOLOGICAL SOCIETY. *Secretary*, C. N. Borman, M.D., 802 Medical Arts Bldg., Minneapolis 2. Regular meetings in the Spring and Fall.

Missouri

RADIOLOGICAL SOCIETY OF GREATER KANSAS CITY. *Secretary*, John W. Walker, M.D., 306 E. 12th St., Kansas City, Mo. Meetings last Friday of each month.

ST. LOUIS SOCIETY OF RADIOLOGISTS. *Secretary*, Edwin C. Ernst, M.D., 100 Beaumont Medical Bldg. Meets on fourth Wednesday of each month, October to May.

Nebraska

NEBRASKA RADIOLOGICAL SOCIETY. *Secretary-Treasurer*, O. A. Neely, M.D., 924 Sharp Building, Lincoln. Meetings third Wednesday of each month at 6 P.M. in either Omaha or Lincoln.

New England

NEW ENGLAND ROENTGEN RAY SOCIETY. *Secretary-Treasurer*, George Levene M.D., Massachusetts Memorial Hospitals, Boston, Mass. Meets monthly on third Friday at Boston Medical Library.

New Hampshire

NEW HAMPSHIRE ROENTGEN SOCIETY. *Secretary-Treasurer*, Albert C. Johnston, M.D., Elliot Community Hospital, Keene. Meetings quarterly in Concord.

New Jersey

RADIOLOGICAL SOCIETY OF NEW JERSEY. *Secretary*, W. H. Seward, M.D., Orange Memorial Hospital, Orange. Meetings at Atlantic City at time of State Medical Society and midwinter in Newark as called.

New York

ASSOCIATED RADIOLOGISTS OF NEW YORK, INC. *Secretary*, William J. Francis, M.D., East Rockaway, L. I.

BROOKLYN ROENTGEN RAY SOCIETY. *Secretary-Treasurer*, Abraham H. Levy, M.D., 1354 Carroll St., Bklyn. 13. Meets fourth Tuesday of every month, October to April.

BUFFALO RADIOLOGICAL SOCIETY. *Secretary-Treasurer*, Mario C. Gian, M.D., 610 Niagara St., Buffalo 1. Meetings second Monday evening each month, October to May, inclusive.

CENTRAL NEW YORK ROENTGEN SOCIETY. *Secretary-Treasurer*, Carlton F. Potter, M.D., 425 Waverly Ave., Syracuse 10. Meetings in January, May, and October.

LONG ISLAND RADIOLOGICAL SOCIETY. *Secretary*, Marcus Wiener, M.D., 1430 48th St., Brooklyn 19. Meetings fourth Thursday evening each month at Kings County Medical Bldg.

NEW YORK ROENTGEN SOCIETY. *Secretary*, Wm. Snow, M.D., 941 Park Ave., New York, 28.

ROCHESTER ROENTGEN-RAY SOCIETY. *Secretary*, Murray P. George, M.D., 260 Crittenden Blvd., Rochester 7. Meets at Strong Memorial Hospital, third Monday, September through May.

North Carolina

RADIOLOGICAL SOCIETY OF NORTH CAROLINA. *Secretary-Treasurer*, James E. Hemphill, M.D., Professional Bldg., Charlotte 2. Meets in May and October.

North Dakota

NORTH DAKOTA RADIOLOGICAL SOCIETY. *Secretary*, Charles Heilman, M.D., 1338 Second St., N., Fargo

Ohio

OHIO RADIOLOGICAL SOCIETY. *Secretary*, Henry Snow, M.D., 1061 Reibold Bldg., Dayton 2. Next meeting at annual meeting of the Ohio State Medical Association.

CENTRAL OHIO RADIOLOGICAL SOCIETY. *Secretary*, Hugh A. Baldwin, M.D., 347 E. State St., Columbus.

CLEVELAND RADIOLOGICAL SOCIETY. *Secretary-Treasurer*, Carroll C. Dundon, M.D., 11311 Shaker Blvd. Cleveland 4. Meetings at 6:30 P.M. on fourth Monday, October to April, inclusive.

RADIOLOGICAL SOCIETY OF THE ACADEMY OF MEDICINE (Cincinnati Roentgenologists). *Secretary-Treasurer*, Samuel Brown, M.D., 707 Race St., Cincinnati 2. Meets third Tuesday of each month.

Oklahoma

OKLAHOMA STATE RADIOLOGICAL SOCIETY. *Secretary-Treasurer*, Peter M. Russo, M.D., 230 Osler Building, Oklahoma City. Meetings three times a year.

Pennsylvania

PENNSYLVANIA RADIOLOGICAL SOCIETY. *Secretary-Treasurer*, James M. Converse, M.D., 416 Pine St., Williamsport 8. Meets annually.

PHILADELPHIA ROENTGEN RAY SOCIETY. *Secretary*, Calvin L. Stewart, M.D., Jefferson Hospital, Philadelphia 7. Meets first Thursday of each month at 8:00 P.M., from October to May in Thomson Hall, College of Physicians, 21 S. 22d St.

PITTSBURGH ROENTGEN SOCIETY. *Secretary-Treasurer*, Lester M. J. Freedman, M.D., 415 Highland Bldg., Pittsburgh 6. Meets second Wednesday of each month at 6:30 P.M., October to May, inclusive.

Rocky Mountain States

ROCKY MOUNTAIN RADIOLOGICAL SOCIETY. *Secretary-Treasurer*, A. M. Popma, M.D., 220 N. First St., Boise, Idaho.

South Carolina

SOUTH CAROLINA X-RAY SOCIETY. *Secretary-Treasurer*, Robert B. Taft, M.D., 103 Rutledge Ave., Charleston 16.

Tennessee

MEMPHIS ROENTGEN CLUB. Meetings second Tuesday of each month at University Center.

TENNESSEE RADIOLOGICAL SOCIETY. *Secretary-Treasurer*, J. Marsh Frére, M.D., 707 Walnut St., Chattanooga. Meets annually with State Medical Society in April.

Texas

DALLAS-FORT WORTH ROENTGEN STUDY CLUB. *Secretary*, X. R. Hyde, M.D., Medical Arts Bldg., Fort Worth 2. Meetings on third Monday of each month, in Dallas in the odd months and in Fort Worth in the even months.

TEXAS RADIOLOGICAL SOCIETY. *Secretary-Treasurer*, R. P. O'Bannon, M.D., 650 Fifth Ave., Fort Worth 4.

Utah

UTAH STATE RADIOLOGICAL SOCIETY. *Secretary-Treasurer*, M. Lowry Allen, M.D., Judge Bldg., Salt Lake City 1. Meets third Wednesday, January, March, May, September, November.

UNIVERSITY OF UTAH RADIOLOGICAL CONFERENCE. *Secretary*, Henry H. Lerner, M.D. Meets first and third Thursdays, September to June, inclusive, at Salt Lake County General Hospital.

Virginia

VIRGINIA RADIOLOGICAL SOCIETY. *Secretary*, E. Latan Flanagan, M.D., 215 Medical Arts Bldg., Richmond 19.

Washington

WASHINGTON STATE RADIOLOGICAL SOCIETY. *Secretary-Treasurer*, Frederic E. Templeton, M.D., 324 Cobb Bldg., Seattle 1. Meetings fourth Monday, October through May, at College Club, Seattle.

Wisconsin

MILWAUKEE ROENTGEN RAY SOCIETY. *Secretary-Treasurer*, C. A. H. Fortier, M.D., 231 W. Wisconsin Ave., Milwaukee 3. Meets monthly on second Monday at the University Club.

RADIOLOGICAL SECTION OF THE WISCONSIN STATE MEDICAL SOCIETY. *Secretary*, S. R. Beatty, M.D., 185 Hazel St., Oshkosh. Two-day meeting in May and one day at annual meeting of State Medical Society in September.

UNIVERSITY OF WISCONSIN RADIOLOGICAL CONFERENCE. Meets first and third Thursdays 4 to 5 P.M., September to May, inclusive, Room 301, Service Memorial Institute, 426 N. Charter St., Madison 6.

CANADA

CANADIAN ASSOCIATION OF RADIOLOGISTS. *Honorary Secretary-Treasurer*, E. M. Crawford, M.D., 2100 Marlowe Ave., Montreal 28, Quebec. Meetings in January and June.

LA SOCIÉTÉ CANADIENNE-FRANCAISE D'ELECTROLOGIE ET DE RADIOLOGIE MÉDICALES. *General Secretary*, Origéne Dufresne, M.D., Institut du Radium, Montreal. Meets on third Saturday of each month.

CUBA

SOCIEDAD DE RADIOLOGÍA Y FISIOTERAPIA DE CUBA. Offices in Hospital Mercedes, Havana. Meets monthly.

ABSTRACTS OF CURRENT LITERATURE

ROENTGEN DIAGNOSIS

The Head and Neck

BLONDER, EDWIN J. Visualization of Otitic Brain Abscess with Iodized Oil 92

SELANDER, ERIC. Roentgen Appearance of the Anterior Wall of the Sulcus Sigmoideus 92

LEITER, LOUIS, SEIDLIN, S. M., MARINELLI, L. D., AND BAUMANN, E. J. Adenocarcinoma of the Thyroid with Hyperthyroidism and Functional Metastases. I. Studies with Thiouracil and Radio-Iodine 92

JACOBSEN, H. H. On the Normal Arthrogram of the Mandibular Joint 92

The Chest

LODGE, THOMAS. Anatomy of the Blood Vessels of the Human Lung as Applied to Chest Radiology. Changes in the Lung Vascular Tree in Disease Processes. Emphysema and Asthma 92

HODSON, C. J. Localisation of Foreign Bodies in the Chest: A Practical Report 93

ADAMS, RALPH. Primary Lung Tumors 93

KLOSK, EMANUEL, BERNSTEIN, ARTHUR, AND PARSONNET, AARON E. Cystic Disease of the Lung 94

SANTE, L. R. A Roentgen-Ray Classification of the Pneumonias, with Special Reference to the Tissues Involved 94

McDONALD, JOHN B., AND EHRENPREIS, BERNARD. Clinical and Roentgenographic Manifestations of Primary Atypical Pneumonia, Etiology Unknown 95

MANSMANN, JAMES A., AND OSMOND, LESLIE H. Complications of Bronchial Asthma and Their Association with Bronchostenosis 95

SODEMAN, W. A., AND STUART, B. M. Lipoid Pneumonia in Adults 96

BROOKE, H. H. W. Chest X-Ray Survey of Repatriated Prisoners of War from Japanese Camps 96

HEATH, ERLE M. Spontaneous Pneumothorax in Healthy Young Adults, with Particular Reference to the Etiological Role of Aerial Ascent 97

BRUNNER, A. Displacement of the Mediastinum and Its Practical Significance 97

MILLER, JOHN F., AND KEAN, B. H. Displacement of the Mediastinum Due to Pulsion by a Caseous Tuberculous Lung without Pleural Effusion. Report of a Case in an Infant 97

FOSSATI, FRANCO. Wedge-Shaped Shadows of Fleischner 97

GLADNIKOFF, H. Roentgenological Picture of the Coarctation of Aorta and Its Anatomical Basis 97

SELLORS, T. HOLMES. Constrictive Pericarditis .. 98

NATHAN, DAVID A., AND DATHE, RICHARD A. Pericarditis with Effusion Following Infections of the Upper Respiratory Tract 98

The Digestive System

ZIMMER, E. A. Roentgenology of the Small Bowel 99

HUNT, CLAUDE J. Early Diagnosis and Management of Small Intestinal Obstruction ... 99

BRADY, J. H. Volvulus of the Cecum—with Left Sided Colon. Report of Case 99

GALLOWAY, BEN T. Extra-Intestinal Amebiasis and Its Diagnosis 100

CASATI, ANNIBALE. Value of the "Water Test" in the Radiologic Study of the Gallbladder ... 100

CASE, JAMES T., AND POWERS, KENNETH V. Do Resin Cathartics Cause Gallbladder Contraction? 100

Abdominal Wounds

MICHELS, LEON M. Preoperative Diagnosis of Recent Wounds of the Abdomen 100

The Musculoskeletal System

LINDBLOM, KNUT. Lumbar Myelography by Abrodil 101

BUCHMAN, JOSEPH. Circumscribed Post-Traumatic Osteoporosis of the Lower Ends of the Radius and Ulna 101

SUTRO, CHARLES J. Fissures of the Articular Cartilage of the Patella. Occurrence in Multipartite Patella 101

LUBSCHITZ, KAREN. A Case of Tibia Recurvata .. 102

LEVETON, ALBERT L. March (Fatigue) Fractures of the Long Bones of the Lower Extremity and Pelvis 102

HENDELBERG, THORSTEN. Roentgenographic Examination of the Ankle Joint in Malleolar Fractures 102

JANSSON, GÖSTA. Roentgenologic Skeletal Changes in Myeloma in Childhood (Platyspondylia generalisata myelomatosa) 103

Gynecology and Obstetrics

DECKER, ALBERT. Artificial Pneumoperitoneum by Cul-de-Sac Puncture. A New Technic for Pelvic Pneumograms 103

MARSHAK, RICHARD H. Radiologic Diagnosis of Ectopic Pregnancy 103

The Genito-Urinary System

LINDBLOM, KNUT. Percutaneous Puncture of Renal Cysts and Tumors 104

The Blood Vessels

MOSES, WILLIAM R. Early Diagnosis of Phlebothrombosis 104

IMPERATI, LUIGI. Phlebography: Anatomical, Physiopathological and Clinical Considerations..... 104

Technic

ILLINGWORTH, G. H. Duplication of Radiography by Solarisation..... 104

RADIOTHERAPY

Neoplasms

WHITE, CHARLES S. Evaluation of the Treatment of Cancer of the Breast, with a Suggestion for Its Modification..... 104

GUARINI, CARLO. Roentgen Treatment of Carcinoma of the Breast..... 105

JACKMAN, JAMES, AND BACON, RALPH D. Radiation Treatment of Carcinoma of the Female Urethra..... 105

BALL, HOWARD A. Obscure Lymphosarcoma..... 105

REINHARD, EDWARD H., MOORE, CARL V., BIERBAUM, OLGA S., AND MOORE, SHERWOOD. Radioactive Phosphorus as a Therapeutic Agent. A Review of the Literature and Analysis of the Results of Treatment of 155 Patients with Various Blood Dyscrasias, Lymphomas, and Other Malignant Neoplastic Diseases..... 105

FORSSBERG, ARNE. A Study of the Distribution of Radioactive Phosphorus in Three Cases of Cancer..... 106

Non-Neoplastic Disease

PARENTI, SILVIO. The Struggle with Tinea. Combined Treatment with Roentgen Rays and Thallium..... 106

MUSCETTOLA, GIUSEPPE. Physical Therapy of Sinusitis by the Combined Action of Radiations..... 106

PIERGROSSI, ALDO. Roentgen Therapy for Varicose Ulcer..... 106

ROENTGEN DIAGNOSIS

THE HEAD AND NECK

Visualization of Otitic Brain Abscess with Iodized Oil. Edwin J. Blonder. J. A. M. A. **130:** 635–636, March 9, 1946.

A case is presented in which lipiodol was used to delineate a temporosphenoidal abscess one week following a radical mastoidectomy, at which time the abscess had been uncovered. Roentgenograms revealed a "beautiful filling of the abscess cavity." A large rubber drain was then inserted, and subsequent films showed evacuation of the lipiodol within a week. The author reached the conclusion that iodized oil is useful in outlining an established otogenic temporosphenoidal abscess and in addition may have some therapeutic value.

Roentgen Appearance of the Anterior Wall of the Sulcus Sigmoideus. Eric Selander. Acta radiol. **27:** 60–65, Jan. 31, 1946. (In English.)

In roentgenograms of the mastoid region, there may be seen in some instances, double convex lines curving forward. The anterior line has been interpreted as the anterior wall of the sigmoid sinus and the posterior as the posterior border of the pyramid. Among 200 roentgenograms studied, the author found 54 displaying these double contours. On stereoscopic examination, however, the anterior contour was found to lie medial to the posterior in 52 of the 54 cases, a relationship which could not occur if the anatomical explanation mentioned above were correct. As a result of this observation, studies were made of 30 temporal bones, and roentgenograms were made with metal wires in place to outline the contours sharply. The posterior contour was found to represent the anterior wall of the sigmoid sinus, while the anterior contour was due to a bony eminence on the posterior surface of the pyramid. ELIZABETH A. CLARK, M.D.

Adenocarcinoma of the Thyroid with Hyperthyroidism and Functional Metastases. I. Studies with Thiouracil and Radio-Iodine. Louis Leiter, S. M. Seidlin, L. D. Marinelli, and E. J. Baumann. J. Clin. Endocrinol. **6:** 247–261, March 1946.

Two cases of adenocarcinoma of the thyroid with functioning metastases and hyperthyroidism were studied with radioactive iodine as an indicator of the physiological activity of the metastases. In one patient, the absence of functional thyroid tissue in the neck, shown by the lack of retention of radioactive iodine, proved that the metastases were responsible for the hyperthyroidism. Iodinization aggravated the symptoms in one patient and produced a slight decrease in hyperthyroidism in the other. Thiouracil brought about a complete remission in both cases, as judged by the effect on the general condition, basal metabolic rate, plasma cholesterol, body weight, and blood iodine. Upon withdrawal of thiouracil, there was a prompt recurrence of hyperthyroidism in each instance. The urinary excretion of radioactive iodine was doubled during the period of maximum effect of thiouracil. From these results, the authors conclude that thiouracil can suppress hormone production in metastases of adenocarcinoma of thyroid, just as readily as it inhibits this process in the hyperplastic thyroid of ordinary Graves' disease.

On the Normal Arthrogram of the Mandibular Joint. H. H. Jacobsen. Acta radiol. **27:** 93–97, Jan. 31, 1946. (In English.)

In interpreting arthrograms of the temporomandibular joint, the mantel-like shadow of the lower portion of the joint is easily explained, but there has been some question as to whether or not the upper joint cavity could produce a similar shadow. The author obtained positive evidence of such a shadow by injecting the superior cavity in two cadavers, making roentgenograms, and subsequently dissecting the joints. The findings were further confirmed by arthrograms on a patient in whom the lower cavity was found at operation to be obliterated by disease. The shadows produced by the two cavities differ in several respects. (1) The contrast is greater in the superior cavity. (2) Views of the upper cavity show a space between the shadow of the condyle and the lower margin of the contrast medium, due to the interposed articular disk. (3) The contrast medium is above the level of the condyle in the superior cavity and around it in the inferior. (4) The contrast medium extends farther anteriorly in the superior cavity.

ELIZABETH A. CLARK, M.D.

THE CHEST

Anatomy of the Blood Vessels of the Human Lung as Applied to Chest Radiology. Changes in the Lung Vascular Tree in Disease Processes. Emphysema and Asthma. Thomas Lodge. Brit. J. Radiol. **19:** 77–87, February 1946.

The author concludes here a thesis, the earlier chapters of which, dealing with the anatomy of the pulmonary blood vessels and their normal radiographic picture, have previously appeared (Brit. J. Radiol. **19:** 1, 1946. Abst. in Radiology **47:** 529, 1946). He begins by enumerating the structures which may be mistaken for the blood vessels and indicating their distinguishing features.

The lymphatics of the lung are not normally visible but in pathological processes they may give rise to a pattern which, like that of the vascular tree, radiates outward from the hilum. There are two main groups, the superficial, arranged in polyhedral rings in the pleura, and the deep, accompanying the arteries, veins, and bronchi. The two groups communicate with each other. Both have valves. Circulation may be in any direction in the superficial but only toward the hilum in the deep group. The lymphatics may be involved by disease directly or by back pressure. The shadows on the film are thinner, more numerous, and closer together than the other vascular markings. They may appear as polyhedral markings in the periphery or as radiating lines from the hilum.

The only other important shadows to be differentiated from the blood vessels are those due to linear fibrosis. These are almost invariably fine, sharp lines not following the direction of any known vessel, and even crossing the vessels at various angles. Occasionally in the presence of an inflammatory condition, a bronchus may show the same degree of opacity as a blood vessel.

An increase in the number and size of the blood vessels is seen in the hyperemia which accompanies

many pathological states. Active hyperemia is found in pertussis, pneumonia, diffuse bronchiectasis, and general pyrexia, especially in children. In hyperthyroidism, also, there is invariably hyperemia with enlargement of the pulmonary artery. Localized hyperemia may be observed around a localized area of inflammation. Passive hyperemia will be seen in cardiac failure and obstruction of the pulmonary vein at the hilum.

There is an absence of vessel markings in extreme degrees of emphysema, local or general, in pneumothorax, and in congenital cystic disease. Crowding of the vessels may be due to diminished volume of a lobe or lobes, as in bronchiectasis, carcinoma, or the presence of a foreign body, or to external pressure as from pleural effusion. Obliteration of the vessels takes place in pneumonic consolidations, collapse, pleural effusion, silicosis, metastatic cancer, and pulmonary edema and infarction. In the so-called compensatory type of emphysema there is a fanning out of the vessels, and in the presence of a neoplastic mass they may be locally displaced or kinked. Advanced upper lobe fibrosis due to fibroid tuberculous lesions may be accompanied by a generalized displacement.

The most striking radiological feature in emphysema and asthma relative to the pulmonary vessels is their unusual clarity. Vessels may be traced that are normally invisible. In emphysema the vessels are apparently decreased in diameter. This thinning is less frequent in asthma, and the smaller vessels, in contrast with emphysema, are often visible as a fine meshwork background. SYDNEY J. HAWLEY, M.D.

Localisation of Foreign Bodies in the Chest: A Practical Report. C. J. Hodson. Brit. J. Radiol. 19: 70–76, February 1946.

The author was able to assess the results of localization in a series of about 200 cases seen in an army chest center where it was the policy, provided the risk of operation was reasonable, to remove all foreign bodies over 1 cm. in diameter lying in the rib plane or within the thoracic cavity, except certain ones in the heart. As a result of his observations he concludes that the localization of such foreign bodies should be anatomical rather than geometrical. All missiles cannot be accurately localized. The greatest difficulty is offered by those lying in fibrin inside the chest wall, those in the paravertebral tissues, and small ones in or between the ribs.

The general routine calls for preliminary postero-anterior and lateral films, with good penetration, made in the upright position. These will allow a rough estimation of the location of the foreign body. They should be followed by appropriate studies of greater accuracy, including screening and tangential films, with observation of movement relative to anatomical structures. In many instances fluoroscopic assistance at the operating table is required.

Skin marking for foreign bodies outside the ribs and in the plane of the ribs is not considered satisfactory. These are best localized by passing a needle to them under fluoroscopic guidance before operation. For missiles just beneath the rib plane, tangential screening and films are recommended.

Mediastinal foreign bodies should be carefully studied fluoroscopically to determine by position and motion near what structure they lie. A swallow of barium and a trickle of iodized oil down the trachea are often necessary. Fluoroscopy at operation may be required, as foreign bodies in this location are often difficult to palpate.

Paradiaphragmatic foreign bodies present special problems. Sometimes it is not possible to tell whether they lie above or below the diaphragm. A barium swallow, pneumoperitoneum, and pneumothorax are sometimes helpful.

Careful study of its motion may indicate whether a foreign body lies within or adjacent to the heart and its relationship to the chambers. Fluoroscopy is most important, for blurring by motion may interfere with demonstration on the film.

Intrapulmonary foreign bodies are the easiest to localize. There is often some degree of collapse. Three things may simulate a foreign body on palpation: a calcified node, a bronchus, or a missile track.

SYDNEY J. HAWLEY, M.D.

Primary Lung Tumors. Ralph Adams. J. A. M. A. **130:** 547–553, March 2, 1946.

In the fifteen-year period from 1930 to 1944, a diagnosis of primary lung cancer was established microscopically in 157 cases at the Lahey Clinic. A clinical diagnosis of pulmonary cancer was made 199 times during the same period. Among the 157 proved cases, males predominated, 128 to 29. One-third of the adenocarcinomas occurred in women, while epidermoid cancer and the highly malignant oat-cell cancer appeared almost exclusively in males. Necropsy established the diagnosis in 5 instances. Particular attention is called to 2 cases of metastatic carcinoma of the brain for which craniotomy was performed under the erroneous diagnosis of primary brain tumor; in neither instance had a roentgenogram of the chest been obtained.

The five most common symptoms of pulmonary cancer encountered in these patients were cough (146), pain (85), sputum (83), hemoptysis (69), and wheeze (22). Dyspnea was recorded in 27 patients and was associated with pleural effusion in all but one.

A diagnosis of primary cancer was made roentgenologically or stated as a positive suspicion in 152 cases; the diagnosis was missed in 2; in 3 cases no roentgenogram was taken. Each of the 2 frankly misdiagnosed cases was called tuberculosis until examination of tissue obtained at thoracotomy in one instance and bronchoscopy in the other.

The roentgen features suggestive of pulmonary carcinoma are the shadow of a central or peripheral mass, localized expiratory emphysema, a large amount of emphysema causing shift of the mediastinum away from the lesion occasionally but more often toward the side of the lesion because of bronchial obstruction and atelectasis, signs of collapse, abnormal behavior of the diaphragm, and signs of mediastinal and pleural infiltration. The value of careful fluoroscopy and lateral views, in addition to postero-anterior films, cannot be overemphasized.

Bronchoscopy was done in 122 cases, with a positive diagnosis of cancer in 109 and negative in 13. This procedure should not be employed routinely. Roentgenography is often of value in indicating when help may thus be obtained. Rarely is a tumor seen bronchoscopically when its shadow is circular on the roentgenogram, as such tumors are nearly always peripheral

and arise beyond the major bronchi, no matter how close to the mid-line they may appear on the postero-anterior film. A lateral view will often delineate their peripheral position in respect to the hilum.

Carcinoma cells were found in the pleural effusion in 5 instances. Biopsy of palpable supraclavicular or axillary nodes or other metastases permitted microscopic confirmation of the diagnosis in 25 patients.

Eighty-four of the tumors were epidermoid, 20 adenocarcinoma, 7 oat-cell, 18 undifferentiated, and 28 not classified.

Efforts to control or to arrest advanced and inoperable cancer of the lung have been almost completely unsuccessful. Roentgen therapy has been abandoned as a curative measure. Sixty-three cases in this series were found inoperable at the time the diagnosis of cancer was made. Ninety-four cases were thought to be operable before the thorax was opened. Forty-four patients had thoracotomy only. One patient had local excision of carcinomatous tissue invading the thoracic inlet in an unsuccessful effort to reduce pain. Nine patients died before leaving the hospital and 36 were dead or in terminal stages of the disease at the time of the report. Removal of the neoplasm by pulmonary resection was attempted in 49 cases. In this group there were 10 lobectomies with no hospital deaths and 39 pneumonectomies with 8 hospital deaths. (Technical procedures have reduced the hospital mortality in the last four years in 30 consecutive resections to 3.3 per cent.) Twenty-three patients have died since leaving the hospital. At the time of the report, 4 patients were living with recurrence and 14 were living and well. The longest survival to that date was nine years.

During the fifteen-year period, 7 microscopically confirmed non-malignant tumors (6 bronchial adenomas, 1 myxochondroma) were encountered. All 7 patients were women. The symptomatology and diagnostic features in this group were similar to those of the cancer series. The diagnosis was suggested by roentgenography in all cases. Bronchoscopic removal of the tumor sufficed in 2 patients, 5 required pneumonectomy. All the patients were living at the time of the report.

Cystic Disease of the Lung. Emanuel Klosk, Arthur Bernstein, and Aaron E. Parsonnet. Ann. Int. Med. **24:** 217–232, February 1946.

Cystic disease of the lung may be defined as any condition in which the lung parenchyma is replaced by sharply defined cavities containing fluid or air. It may be congenital, acquired, or both, although the prevalent opinion seems to lean to a congenital origin. The authors exclude from their discussion dermoid cysts of the lung, echinococcus cysts, and encapsulated interlobar accumulations of fluid or air.

Large solitary cysts, occupying one or more lobes and often displacing the heart and mediastinum to the contralateral side, are usually found in infancy and in early childhood, giving symptoms of cyanosis and dyspnea, accompanied by physical signs of a tension pneumothorax. Roentgenologically these cysts appear as large areas of radiolucency, with or without evidence of fluid. As a rule, the cystic spaces are well defined and frequently they are traversed by linear strands of trabeculation.

A second form of cystic disease, apparently congenital, is one in which the pulmonary parenchyma is replaced by areas of cystic degeneration ranging from multiple miliary cysts scattered throughout the lungs to large multilocular or unilocular cysts occupying one or more lobes. These cystic cavities communicate freely with bronchi and are lined with columnar ciliated or non-ciliated epithelium and show the usual architecture of a bronchus. Radiographically the pulmonic fields have a honeycomb appearance. The lung structure shows a large number of thin-walled, sharply defined annular shadows without accompanying interstitial parenchymal infiltration. This roentgen appearance is especially diagnostic when the lesions are in the upper lobe, are bilateral, and there is no distortion of the thoracic cage or retraction of the mediastinum as in the acquired forms of bronchiectasis. The direct communication with the bronchus can be demonstrated on bronchography and the grape-like clusters of cystic spaces will be delineated.

Acquired pneumatocele or cystic disease is usually associated with respiratory infection, chronic bronchitis or peribronchitis, pulmonary fibrosis and emphysema, or bronchial asthma. It is evident that any pathologic lesion causing incomplete bronchial obstruction will be followed by obstructive emphysema with distention of the corresponding alveoli and thinning with resultant final rupture of the alveolar septa. Roentgenographically, acquired pneumatocele presents itself as a poorly defined annular shadow devoid of pulmonary markings. A close scrutiny will show fine linear bands traversing the cystic space. It is obvious that from a roentgen and clinical point of view, it may be very difficult to distinguish these acquired cysts from the congenital form of solitary cyst described above.

On the x-ray film, the differential diagnosis from a localized pneumothorax may be made by the establishment of a diagnostic pneumothorax. The cyst wall will then be separated from the thoracic cage and its cystic nature will become discernible. Removal of air will alter intraluminary pressure very little in cystic disease, whereas well defined changes in the intrapleural readings will take place in localized pneumothoraces.

Aside from the large solitary cysts which balloon out under the influence of a check-valve mechanism at the bronchial orifice, and are fatal early in life, cystic disease seldom produces symptoms. Complications, however, are common. Probably the most frequent is hemorrhage, which occurred in 4 of the author's 13 cases. The source of the hemorrhage has not been established. It is suggested that blood vessels coursing in the cyst wall, unsupported on their luminary side, may be prone to rupture under the strain of increased intrapulmonic arterial pressure. The next complication in order of frequency is infection, with surrounding pneumonitis. A third complication is spontaneous pneumothorax.

Twelve illustrative case histories are included.

STEPHEN N. TAGER, M.D.

A Roentgen-Ray Classification of the Pneumonias, with Special Reference to the Tissues Involved. L. R. Sante. J. Missouri M. A. **43:** 93–97, February 1946.

The purpose of this article is to clarify the roentgenographic types of pneumonic involvement. The major forms are as outlined below. Each is discussed briefly, and line sketches "caricature" the various types.

A. Lobar pneumonia
   1. Pneumococcus type
   2. Staphylococcus type
   3. Caseous tuberculous pneumonia
   4. Tularemic pneumonia
   5. Friedländer bacillus pneumonia, pseudolobar stage.
      (*a*) Stage of lobar involvement
      (*b*) Coalescence to form stage of pseudolobar distribution
      (*c*) Rapid, extensive ulceration with multiple cavity formation
      (*d*) Final stage of repair with dense fibrosis

B. Bronchopneumonia
   1. Type caused by usual bacterial respiratory infections, with the radiographic appearance of a "bunch of grapes," occurring bilaterally in the lower lobes
   2. Friedländer bacillus pneumonia; four stages as in lobar pneumonia of this type, but with bronchopneumonic type of consolidation at the onset

C. Septic lobular pneumonia, associated with septicemia caused by Streptococcus, anaerobic Streptococcus, or Staphylococcus

D. Glandular or lymphatic type pneumonitis
   1. Tularemic pneumonia
      (*a*) Primary pneumonic stage
      (*b*) Glandular stage
   2. Measles pneumonia
   3. Whooping cough

E. Atypical pneumonia
   1. Virus pneumonia, with (1) hilar enlargment, due to central parenchymal infiltration, and peripheral spread; (2) fine lobular infiltration which may coalesce
      (*a*) Influenzal pneumonia
      (*b*) Psittacosis
      (*c*) Mongoose virus
      (*d*) Mouse virus
      (*e*) Undoubtedly many others
   2. Rickettsial pneumonia
   3. Protozoal pneumonia
   4. Drug sensitization pneumonia
   5. Undoubtedly many others of this type
      (*a*) Typhus fever
      (*b*) Rocky Mountain spotted fever
   6. Lipoid pneumonitis

SYDNEY F. THOMAS, M.D.

Clinical and Roentgenographic Manifestations of Primary Atypical Pneumonia, Etiology Unknown. John B. McDonald and Bernard Ehrenpreis. Ann. Int. Med. **24:** 153–169, February 1946.

The authors present a clinical study of 75 cases and roentgenologic observations in 135 cases of atypical pneumonia.

What is regarded as the typical syndrome is a cold of three to ten days' duration, followed by suddenly developing chills, fever, shortness of breath, cough, headache, sore throat, and generalized aches and pains. This syndrome was present in 47 per cent of the authors' series. In another 40 per cent there was a history of sharp pain in the chest, aggravated by cough and deep inspiration. Physical signs were not comparable in degree with the extent of the lesion as disclosed by the roentgenogram.

Roentgenographically, the lesions are of two main types: (1) benign circumscribed pneumonia, (2) disseminated focal pneumonia. The benign circumscribed lesion is fairly well localized but not sharply defined. It is of uniform density and is located usually in the lower lobes. The disseminated focal type produces a picture of diffuse, rather coarse mottling, the foci measuring from 2.0 to 5.0 mm. There were only 9 cases of this focal type in the authors' series of 135 cases.

The lesions of atypical pneumonia have been found chiefly to show a segmental lobular distribution. The transparent lobules are surrounded by increasingly thickened perilobular septa until the lobules disappear, either due to collapse or exudate, thus leading to the picture of consolidation. The conspicuous feature appears to be the engorgement of the perilobular structures or septa, which is seen in the initial stages and persists around the re-illuminated lobule during the resolution of the process.

Primary pulmonary coccidioidomycosis and, to a lesser extent, pulmonary tuberculosis require differentiation. The chief distinguishing features are the infrequent involvement of the upper lobes in atypical pneumonia and its rapidity of resolution. Basal involvement, in the form of consolidations lodged in the cardiophrenic angle, was a predominant feature in over 80 per cent of the cases here considered.

Atypical pneumonia has a high morbidity but a low mortality, and complications are infrequent. In 9 patients of the present series, a slight pleural effusion occurred. One patient had a moderate pleural effusion which required prolonged hospitalization. Three lung abscesses developed, probably from secondary pyogenic invaders; all healed spontaneously.

STEPHEN N. TAGER, M.D.

Complications of Bronchial Asthma and Their Association with Bronchostenosis. James A. Mansmann and Leslie H. Osmond. Pennsylvania M. J. **49:** 513–517, February 1946.

One of the cardinal features of bronchial asthma is a narrowing of the bronchi as a result of spasm, a bronchial plug, edema, or actual stenosis. Such occlusion may be partial or complete. It is the mechanism which precedes the development of such other complications as emphysema, atelectasis, bronchiectasis, spontaneous pneumothorax, and mediastinal emphysema, and its early discovery is of the first importance. Bronchostenosis may be due to infection or to an allergic factor with infection superimposed. To determine whether or not allergy plays a role, the authors suggest examination of a nasal smear for the presence of eosinophils.

A properly conducted roentgen examination has been found of considerable help in the recognition of bronchostenosis associated with bronchial asthma. The roentgen findings are dependent upon two outstanding disturbances of function resulting from stenosis; (1) movement of air entering or leaving the segment of pulmonary tissue beyond the site of the stenosis is inhibited; (2) bronchial secretions are retained distal to the stenotic region. A double exposure film (or two films) taken at full inspiration and expiration will show a shift of the heart shadow of from 5 to 10 mm. toward the affected side. This shift can also be seen fluoroscopically. There is usually a thickened fuzzy outline of bronchovascular markings in the affected area, and there is frequently a fan-like area of increased den-

sity through which bronchovascular markings can be seen. Films are reproduced demonstrating the cardiac shift, and bronchograms revealing the constriction.

Treatment is directed toward the causative factor, allergy or infection. Bronchoscopic dilatation and bronchodilating drugs are indicated.

JOSEPH T. DANZER, M.D.

Lipoid Pneumonia in Adults. W. A. Sodeman and B. M. Stuart. Ann. Int. Med. **24:** 241–253, February 1946.

The term lipoid pneumonia should be strictly confined to a productive inflammation of the lung in which the fundamental histologic alterations are directly attributable to the presence of foreign oil or fat. In adults the condition is likely to be due to the use of mineral oil as a laxative, while in children vitamin oils are more commonly responsible.

Clinically, the expressions of lipoid pneumonia may be grouped as follows:

I. Asymptomatic
   - A. Not recognized before autopsy.
   - B. Physical findings leading at times to a roentgen diagnosis.
   - C. Findings on roentgen examination without remarkable physical findings.

II. Symptomatic, with the findings in B and C, above, expressed as
   - A. Acute pneumonitis simulating aspiration pneumonia; protracted bronchopneumonia.
   - B. Recurrent acute pulmonary infection with clinical evidences of repeated attacks of bronchopneumonia.
   - C. Low-grade bronchial or pulmonary infection which leads to roentgen findings.
   - D. Picture simulating carcinoma of the lung, with cough, pain in chest, and related symptoms leading to roentgen findings which simulate those of carcinoma.
   - E. Lipoid pneumonia incidentally found in association with other pulmonary disease.
   - F. Association of any of the above pictures with a clinical state predisposing to aspiration, such as bulbar palsy, multiple sclerosis, other causes of dysphagia, and severe debilitating disease.

The frequency of asymptomatic cases is evident from reports in the literature. In one autopsy series of 41 cases, 25 per cent were without symptoms, and in 4 of these roentgen studies were negative.

The roentgenologic findings vary widely. In many instances exaggeration of the bronchovascular markings in the lower lobes may be the only evidence. Small areas of increased density may appear along the bronchial markings. Evidence of fibrous and atelectatic areas may develop in the surrounding parenchyma. Nodulation may appear and when lesions reach sufficient size, areas interpreted as consolidation are seen. The areas of nodulation are frequently very sharply defined. At times they may be feathery. Again they favor the bases, especially the right base, and tend to spread from the hilar areas. Superimposed secondary infection may cause the shadows to vary from time to time. Compensatory emphysema occurs. Confusion may occur with bronchiectasis, tuberculosis, primary and secondary carcinoma, pulmonary infarction, acute bronchopneumonia, unresolved pneumonia, fungus infections, and pneumoconiosis. Obviously *no roentgenologic picture is diagnostic of lipoid pneumonia.*

Clinically, also, lipoid pneumonia may simulate a wide variety of pulmonary conditions. Of the symptomatic types, that designated above as A—acute pneumonitis—presents the most dramatic picture, leading frequently to a diagnosis of acute bronchopneumonia. In bronchopneumonia which runs a protracted course, oil aspiration should be suspected as the cause. The type of oil may determine the symptomatology. Animal oils, especially cod liver oil, are highly irritating, whereas some vegetable oils are relatively non-toxic. Cod liver oil is more likely to give an acute picture of this type than is mineral oil.

Another of the more striking clinical pictures is that designated as B—recurrent pulmonary infection with clinical evidence of repeated attacks of bronchopneumonia. A case of this type is reported in some detail. A case of Type D, simulating carcinoma of the lung is also presented.

The clinical diagnosis rests primarily upon a strong suspicion of the disease when other explanations of the clinical picture are not well established. A history of the use of an oil either intranasally or by ingestion increases the probability that the condition is due to oil aspiration. Physical findings are of little differential value, but are extremely important since they lead to roentgenologic investigation. Slow change in the character of the lesions on serial examinations, particularly in the lower lobes, plus an unresolved bronchopneumonia and roentgenologic findings out of proportion to clinical symptoms and signs should lead to attempts to obtain the clinical associations mentioned above. Confirmation may be sought by demonstration of oil in the sputum several days after oil has been discontinued as nose drops or by mouth. This may be done by letting sputum stand, then covering it with a cigarette paper to absorb the oil droplets, or by microscopic examination.

STEPHEN N. TAGER, M.D.

Chest X-Ray Survey of Repatriated Prisoners of War from Japanese Camps. H. H. W. Brooke. Canad. M. A. J. **54:** 141–144, February 1946.

A chest x-ray survey was made of 1,507 prisoners of war repatriated from Japanese camps. Approximately 100 of the 1,507 had chest films made at U. S. Naval Stations within two weeks of the time of their release from the prison camps. In the remainder of the group the radiographs were made within six to eight weeks after removal from the prison camps. All but a very small number had been held in prison camps since December 1941, subsisting on a totally inadequate diet and working for the most part at road building and underground in mines. All of the men suffered from beriberi in an advanced clinical stage.

In reviewing these chest films, the author has divided the study into three parts. First, in regard to the *thoracic cage,* all of the radiographs appeared to indicate a physiological age considerably beyond the chronological age. There was a depletion of the calcium content of the bone structures, and 17 men showed healing rib fractures with poor calcium content in the callus formation. In 2 cases of multiple posterior fractures, entire rib segments appeared to be missing, which may have been due to previous open drainage.

The *pleural and pulmonary lesions* are presented in tabular form. Questionable minimal tuberculosis was found in 24 of the series, active minimal tuberculosis in 33, moderately advanced tuberculosis in 7, and far advanced tuberculosis in 2. There were discovered, also, 3 cases of lobar pneumonia, 7 of atypical pneumonia, and 1 of pneumonia with cavitation, due possibly to Friedländer's bacillus. There were 36 cases of active or inactive pleurisy and 5 of pleurisy with effusion.

The *cardiovascular* studies were concerned largely with the size and shape of the heart. In the entire series of 1,507, only 3 persons were found having a cardiothoracic index of over 0.5. All of these had an aortic rather than a mitral or globular type of cardiac configuration. Cardiac measurements were made on 435 chest radiographs. As far as could be determined from a study of these films, there was no evidence of definite enlargement of the heart due to beriberi in any instance. BERNARD S. KALAYJIAN, M.D.

Spontaneous Pneumothorax in Healthy Young Adults, with Particular Reference to the Etiological Role of Aerial Ascent. Erle M. Heath. Am. J. M. Sc. **211:** 138–143, February 1946.

In a series of 86,916 man-flights in an altitude chamber, only one spontaneous pneumothorax occurred. In one other subject, symptoms due to a preexisting partial pneumothorax necessitated descent from a simulated 17,000 feet. Each "flight" was of ninety minutes' duration, from ground level to a simulated altitude of 30,000 feet at a rate of about 2,000 to 3,000 feet per minute, with a peak altitude being maintained for about fifteen minutes.

In 771 persons undergoing an explosive decompression "flight," which involved a change of from 8,000 feet to 20,000–23,000 feet in less than one second, there was no instance of spontaneous pneumothorax. This type of flight simulated the effect of decompression by gunfire of a pressurized cabin flying at 20,000 feet.

The common explanations for the mechanism of spontaneous pneumothorax are (1) rupture of an emphysematous bleb, (2) rupture of the visceral pleura, and (3) interstitial emphysema of the lungs with an escape of air to the pleura through the mediastinum.

For purposes of comparison, a survey of the incidence of spontaneous pneumothorax was compiled from the literature and the clinical records of an Army Regional Hospital.

From these data, it would seem logical to conclude that changes of altitude encountered in normal aerial flight have no appreciable bearing on the precipitation of spontaneous pneumothorax in individuals with no apparent pre-existing lung disease. The occurrence of spontaneous pneumothorax during normal aerial flight is so rare that it is of no practical significance, and the impression that normal aerial flight is likely to produce spontaneous pneumothorax in a healthy subject is an erroneous one. It seems likely that the occurrence of spontaneous pneumothorax during aerial flight is merely coincidental.

BENJAMIN COPLEMAN, M.D.

Displacement of the Mediastinum and Its Practical Significance. A. Brunner. Schweiz. med. Wchnschr. **76:** 145–150, Feb. 23, 1946.

The mediastinum may shift to the side of less pressure if a pressure difference exists in the chest. If the pressure of one side is elevated, one speaks of "displacement"; if it is reduced, of "pulling to the diseased side." Sometimes the mediastinum does not give under the pressure change, and this leads to the so-called mediastinal hernias. Increased pressure leads to the pulsion type of hernia; decreased pressure to the traction type. The former often occurs in pressure pneumothorax. Traction hernias in the absence of a pneumothorax of the opposite side are rarely described, and two such cases are briefly reported. In spite of high-grade collapse of one lung, residual exudate can remain latent in the chest for several years, finally to be manifested when it breaks into the lung and leads to gross expectoration. Similarly a free pleural opening may be kept up by inflation from the adjacent lung without much obvious evidence.

LEWIS G. JACOBS, M.D.

Displacement of the Mediastinum Due to Pulsion by a Caseous Tuberculous Lung without Pleural Effusion. Report of a Case in an Infant. John Fleek Miller and B. H. Kean. J. Pediat. **28:** 200–203, February 1946.

A case of pulmonary tuberculosis in an infant with enlargement of the caseous lung sufficient to displace the mediastinum toward the other side is described. The chief interest in this case lies in the similarity of the clinical and roentgenologic findings with those of pleurisy with effusion. Flatness to percussion, absence of breath sounds over the entire left side of the chest, and displacement of the heart to the right were considered diagnostic of effusion in the left pleural cavity. Furthermore, the left intercostal spaces bulged and the left side of the chest was splinted and fixed in a way usually characteristic of fluid. The roentgenogram showed homogeneous opacity over the entire left side of the chest, with the heart and trachea shifted to the right, apparently confirming the clinical diagnosis of effusion. On thoracentesis, only a small amount of tuberculous caseous material was obtained. The actual situation was correctly evaluated only at autopsy.

Wedge-Shaped Shadows of Fleischner. Franco Fossati. Radiol. med. (Milan) **32:** 27–37, February 1946.

In 1925 Fleischner (Klin. Wchnschr. **4:** 875, 1925) described wedge-shaped shadows which project from the right side of the mediastinum into the right pulmonary field. He interpreted these shadows as interlobar-mediastinal collections of fluid. Fossati has studied a large number of these cases and he is convinced that the majority of such shadows are due to atelectasis in the right middle lobe. He emphasizes the lordotic position for their visualization.

CESARE GIANTURCO, M.D.

Roentgenological Picture of the Coarctation of Aorta and Its Anatomical Basis. H. Gladnikoff. Acta radiol. **27:** 8–19, Jan. 31, 1946. (In English.)

Because of the progress in thoracic surgery and development of technics of operation upon the great vessels, the diagnosis and roentgenologic evaluation of coarctation of the aorta have become more important. The author reports 3 cases in which resection and anastomosis were done and offers an anatomical explanation for the characteristic roentgenologic appearance. In

addition to the notching of the ribs because of pulsations of the intercostal arteries, which act as collaterals, and hypertrophy of the left ventricle because of the increased load upon the heart, four other variations from the normal roentgenogram have been described: (1) convexity of the left border of the superior mediastinum, (2) indentation in the posterior mediastinum, (3) lack of visualization of the aorta beyond the ascending portion, and (4) convexity in the left side of the barium-filled esophagus at the level of the indentation of the posterior mediastinal shadow.

The author made anatomical observations during operation in the 3 reported cases and concluded that the convexity of the superior mediastinum is caused by the dilatation of the left subclavian artery and that the indentation of the posterior mediastinal shadow corresponds with the junction of the left subclavian and the aorta. He observed an increased tautness of the aorta and, therefore, a decrease in the physiological curves as well as the associated narrowing at the insertion of the ligament of Botalli, thus explaining the incomplete visualization of the aorta physiologically rather than as due to actual anatomical lack of continuity. In none of the cases could a widening of the esophagus to the left be demonstrated, and the author believes this finding, when it does occur, is only apparent because of the impression on the esophagus of the dilated subclavian above the region of indentation produced by a normal aorta. ELIZABETH A. CLARK, M.D.

Constrictive Pericarditis. T. Holmes Sellors. Brit. J. Surg. **33:** 215–230, January 1946.

This article is based on a Hunterian Lecture delivered at the Royal College of Surgeons, April 28, 1944. In constrictive pericarditis the heart is compressed and its normal action is restricted as a result of adhesions producing a layer of dense fibrosis in the pericardial tissues. The essential features of such compression are based on the increase in venous blood pressure with consequent engorgement and edema. Ascites and enlarged liver are constant findings. Pulmonary congestion is clinically and radiologically absent and this is important in the differential diagnosis from congestive heart failure.

The heart muscle is relatively normal but cardiac rhythm is abnormal and all types of irregularity from extra-systoles to auricular fibrillation are encountered. Radiologic study reveals limitation of movement which is not uniform. There is increased width of the supracardiac shadow due to dilatation of the superior vena cava and innominate veins. Other radiological findings are calcification in plaques or bands, reduced excursion of the aortic arch and raising of the heart on swallowing (the swallowing sign of Rabin).

Current literature submits three possible causes for origin of constriction—tuberculous infection, old pyogenic pericarditis, and idiopathic factors. The author's evidence supports tuberculous infection as chief causative agent. The massive avascular collagen of hyaline character in old cases suggests the end-result of widespread and devastating inflammation with great destruction of tissue. This picture is similar to that seen in advanced healing stages of tuberculous inflammation. Pockets of fluid or inspissated pus and debris are often present. Plaques of calcium tend to burrow into the heart muscle.

Surgical removal of the restraining pericardium is the only treatment for established pericardial constriction. Excision should aim primarily at freeing the ventricles. The usual procedure is to resect the anteriorly placed pericardium and to carry the dissection outwards over the apex and around the left border of the heart. The effects of the pericardiectomy are to restore the pulse pressure to normal. A lowering of the venous pressure and reduction of ascites and liver size may be noted within a few weeks, but full and final improvement should not be expected within twelve to eighteen months. Published results give an average of over 50 per cent of cases cured or improved, with an operative mortality of 33 per cent and about 10 per cent subsequent deaths.

The author appends 5 case reports. *Case 1:* An 11-year-old girl had characteristic signs of constrictive pericarditis. Frequent aspirations of pericardial effusion gave no relief. Radiologic examination showed a huge globular contour of the heart with complete absence of pulsation. At operation the pericardium was found to constitute a massive covering to the heart, over 1.0 cm. thick. The excised tissue showed an active tuberculous process. Two years after operation there was marked improvement; kymography showed free movement of the left heart border but complete immobility on the right.

Case 2: A man, aged 43 years, had constriction resulting from a suppurative pericarditis following an empyema. Operation revealed fibrosis of the pericardium and excision was followed by a good recovery.

Case 3: An 11-year-old boy had polyserositis accompanied by constrictive pericarditis. Conservative treatment was carried out for eighteen months to allow the active tuberculous process to become quiescent. Operation was well tolerated but death occurred from ventricular fibrillation.

Case 4: A boy of 18 years showed all the evidence of pericarditis. Within eight months after operation recovery was complete. The pathological report was fibrosis of tuberculous origin.

Case 5: A man of 48 years had symptoms of three years' duration. X-ray examination showed increase in the transverse diameter of the heart with calcification of the pericardium, mainly on the right ventricle and left auricle. (An excellent reproduction of a lateral chest film shows the calcium forming an irregular meshwork round the auricles and great veins.) At operation calcium plaques were found distributed in the auriculoventricular grooves and over the auricles and great veins. Dissection was carried out and the pathological examination showed fibrosis with no evidence of tuberculosis. Ten weeks after operation all symptoms had disappeared. MAX CLIMAN, M.D.

Pericarditis with Effusion Following Infections of the Upper Respiratory Tract. David A. Nathan and Richard A. Dathe. Am. Heart J. **31:** 115–130, February 1946.

The authors report 8 cases of pericarditis with effusion following apparently trivial acute upper respiratory tract infection without pulmonary disease. In 6 of the 8 cases the infection was described as either a cold, or sore throat, or a nasopharyngitis. In 2 cases there was no history of an infection but the patients had a non-productive cough. Roentgenograms reproduced from 5 of the cases show enlargement of the cardiopericardial shadow with subsequent recession.

HENRY K. TAYLOR, M.D.

THE DIGESTIVE SYSTEM

Roentgenology of the Small Bowel. E. A. Zimmer. Gastoenterologia **70:** 113–170, 1945.

This is a 57-page essay on all aspects of the roentgen diagnosis of disease of the jejuum and ileum. It covers the position of the bowel, congenital variations, abnormal gas shadows, foreign bodies, neoplasms, small bowel resections, inflammatory processes, the normal small bowel pattern, and methods of examination. The subject is well covered by an adequate though concise text and numerous illustrations including drawings and reproductions of roentgenograms. Although there is little new material presented, this is a very good review.

LEWIS G. JACOBS, M.D.

Early Diagnosis and Management of Small Intestinal Obstruction. Claude J. Hunt. Surgery **19:** 237–250, February 1946.

Small intestinal obstructions are of two major types: (1) those on the surface of the abdomen, as strangulated hernias, and (2) those hidden within the abdomen. Strangulated hernias are easily diagnosed and, as a rule, reach the surgeon promptly. For these, immediate operation is recommended. Diagnosis in the second, or hidden, group is more difficult and is often delayed with the result that serious complications may ensue before proper treatment is instituted.

Intra-abdominal obstructions are further divided into (1) those due to conditions which do not immediately interfere with the blood supply and thus do not require emergency operation and (2) those due to conditions which do interfere with the blood supply and must be promptly relieved if gangrene of the bowel is to be avoided. In the first group are the simple obstructions due to bands of adhesion, intrinsic lesions, as neoplasms and gallstones, and inflammatory conditions; in the second are strangulated internal hernia, volvulus, intussusception, and mesenteric thrombosis. In simple obstruction, rigidity and localized abdominal tenderness are absent. Their presence is strong evidence of strangulation of a loop of bowel and danger to the blood supply.

There are few early physical signs in intestinal obstruction. Colic is frequently not well localized. Bowel movements and the passage of gas may occur even after obstruction is present, the result of emptying of segments of bowel distal to the point of obstruction. Peristalsis may be visible through the abdominal wall. Vomiting depends on the duration and level of obstruction.

Radiologically, collection of gas in the small bowel may be considered as synonymous with obstruction in the adult, though in very young children this is a normal finding. Gas may collect proximal to an obstructed point within a few hours. In simple obstruction the gas may be centrally located, with a transverse long axis, while in loop obstruction the dilated loops may assume no definite pattern, and proximal bowel distention is slow in developing. Thickening of the walls separating loops suggests fluid or exudate. Gas in the large intestine, in contrast to that in the small bowel, assumes a vertical longitudinal axis, the bowel wall is thicker, and haustral markings are present.

"Stepladdering" of the small bowel indicates advanced obstruction, but the diagnosis is possible long before this condition develops. With complete small intestine obstruction, there is little or no gas in the colon, while with colonic obstruction, there is usually no regurgitation through the ileocecal valve and the small bowel is free of gas. In paralytic ileus, gas may be present in both the small and the large bowel; repeated films will help to make the diagnosis more certain. Consideration must also be given to the silent and painless abdomen as a differential point in diagnosis.

The Miller-Abbott tube has been found useful both in the non-surgical treatment of obstructions due to localized inflammatory processes and as an adjunct in operative cases, either preoperatively or postoperatively. Patients with clinical and radiographic evidence of postoperative small bowel obstruction have frequently recovered following decompression with the Miller-Abbott tube, without operation.

Intussusception may frequently be diagnosed and reduced through use of the barium enema. Small intestinal obstruction may be studied with barium introduced through the Miller-Abbott tube.

Case histories illustrating the different causes of intestinal obstruction, with roentgenograms and pathologic findings, are included.

J. E. WHITELEATHER, M.D.

Volvulus of the Cecum—with Left Sided Colon. Report of Case. J. H. Brady. California & West. Med. **64:** 77–79, February 1946.

A case of volvulus of the cecum is reported, which was directly related to incomplete rotation and deficient fixation of the bowel. The patient was a white male, of seventeen years, admitted to the hospital as an emergency case. His illness began suddenly the previous day with intestinal cramps; there were no bowel movements and no passage of blood or mucus. The abdomen was distended and intermittent vomiting occurred, becoming fecal in character. There had been several previous attacks of cramps, vomiting, and diarrhea, beginning in childhood. The general examination was negative, aside from the abdomen, which was distended and tympanitic, with borborygmus and metallic tinkling. No masses could be felt either abdominally or rectally. Enemas were administered without effect. A barium enema study showed all of the colon to be on the left side of the abdomen, where three distinct loops were present, representing the transverse, ascending, and cecal portions.

At operation, the cecum, appendix, distal ileum, and ascending colon were found to be greatly distended. On following down the loop of intestine, what appeared to be a continuous ileocecocolic mesentery was found. The entire loop had twisted clockwise, having as its axis, apparently, the superior mesenteric vessels, the volvulus being 270 degrees. There were many old adhesions present which had to be freed before it was possible to untwist the loop. Even then, the colon did not seem to be entirely free, but it was possible to bring the cecum into the right lower quadrant. On examination of the ileum it was found that there was a Meckel's diverticulum about 10 inches from the ileocecal valve. After reduction of the volvulus, a cecostomy was performed but no attempt was made to remove the diverticulum.

During the latter part of the patient's hospital stay, he had some intermittent cramps, and these increased gradually following his discharge. Fecal vomiting again occurred and a second operation was done elsewhere. The cecostomy appeared to be functioning normally, but an obstruction was found in the upper

ileum, apparently produced by old adhesions. These adhesions were so dense that it was necessary to resect two inches of the ileum and do a side-to-side anastomosis. Death occurred about eight weeks later. At autopsy, it was found that the entire abdomen had been involved in a severe peritonitis. There was a corrected malrotation of the colon. The cecostomy was open, and there was no obstructive lesion anywhere. The mesentery of the ascending colon was fully as long as that of the transverse colon, allowing great mobility of the ascending colon and cecum. All the other abdominal organs appeared normal.

A brief review of the literature is included.

BERNARD S. KALAYJIAN, M.D.

Extra-Intestinal Amebiasis and Its Diagnosis. Ben T. Galloway. New Orleans M. & S. J. **98:** 373–384, February 1946.

Endamoeba histolytica may invade practically all the organs and tissues of the body, such invasion nearly always originating from the intestinal tract, where the primary infestation occurs. The most common and most important site of extra-intestinal invasion is the liver, with the production of hepatitis or hepatic abscess. Hepatic abscesses were reported as present in 36 per cent of one series of 5,211 fatal cases of amebiasis. The disease is more common in males (86 per cent), and the highest incidence is during the fourth and fifth decades. The most common route of extension from the bowel is believed to be through the tributaries of the portal vein. The organisms lodge in the smaller portal radicals, producing thrombosis with typical infection and consequent focal necrosis.

Amebic hepatic abscesses are usually single (65 per cent), occurring in the right lobe of the liver (85 per cent), near the dome or on the inferior surface near the hepatic flexure. Fever is the most common systemic manifestation (85 per cent); diarrhea may or may not occur. Pain over the liver is the most common local finding. Hepatic enlargement is also a frequent observation.

In 1927 Craig introduced a specific complement-fixation test, though he considers examination of stools, exudate, and pus for amoebae as a more satisfactory diagnostic procedure. Roentgen examination is important, including an upright fluoroscopic study. In uncomplicated liver abscess, bulging and localized doming of the diaphragm are demonstrable. It is possible to distinguish subphrenic abscess complicating a liver abscess from that due to other causes. In the former, there is characteristically an obliteration of the cardiophrenic angle in the anteroposterior roentgenogram and obliteration of the anterior costophrenic angle in the lateral view. In subphrenic abscess due to other causes there is obliteration of the costophrenic angle in the anteroposterior view and of the posterior costophrenic angle in the lateral view. Abscess in the left lobe produces pressure changes in the barium-filled stomach.

Pleuropulmonary complications of amebiasis occur in from 3 to 59 per cent of the cases reported. This complication is usually a result of direct perforation from an amebic hepatic abscess. Rarely, if ever, is primary infection of the lung observed, but a few cases of amebic bronchitis have been described. The cardinal signs of a bronchohepatic fistula are: (1) high fixed right diaphragm; (2) abscess mass near the diaphragm and involving the lung; (3) column of fluid extending from this to the trachea; (4) expectoration of bile-stained sputum.

Amebiasis of the genito-urinary system has been reported, ranging from multiple renal abscesses to amebic cystitis, but is extremely rare.

Amebiasis cutis usually may be classified as: (1) cases following drainage of an amebic abscess of the liver; (2) those following drainage of a ruptured viscus; (3) cases with involvement of the perianal skin associated with amebic colitis; and (4) cases without any direct connection with viscera. In cases of cutaneous involvement the literal meaning of the word "histolytica" is strikingly apparent, as the dissolution of the tissues extends with unbelievable rapidity, and the entity should be borne in mind in considering a differential diagnosis of so-called phagadenic ulcers of the abdomen or thorax.

Other infrequent sites of amebic invasion are the brain, spleen, and biliary tract.

SYDNEY F. THOMAS, M.D.

Value of the "Water Test" in the Radiologic Study of the Gallbladder. Annibale Casati. Radiol. med. (Milan) **32:** 37–47, February 1946.

Casati has observed that the opacity of the gallbladder increases within ten minutes following the ingestion of water and he recommends the administration of water to facilitate the study of gallbladders which are poorly visualized. He also administered barium suspended in water and has noticed the same concentrating effect on the gallbladder shadow.

CESARE GIANTURCO, M.D.

Do Resin Cathartics Cause Gallbladder Contraction? James T. Case and Kenneth V. Powers. Gastroenterology **6:** 182–184, March 1946.

In 23 cases the gallbladder was visualized with an opaque dye and the patient was then given a resin cathartic consisting of 0.75 grain aloes and 0.186 grain podophyllum (3 Carter's Little Liver Pills) by mouth. In no instance was any cholecystokinetic effect observed; that is, in no case did the drug cause any evacuation of the gallbladder. Each of the gallbladders studied showed a normal evacuatory response to a fatty meal. The failure of the gallbladder shadow to increase in size and to decrease in density is interpreted as showing that the resins did not increase the formation of bile by the liver.

ABDOMINAL WOUNDS

Preoperative Diagnosis of Recent Wounds of the Abdomen. Leon M. Michels. Arch. Surg. **52:** 135–148, February 1946.

In determining the degree of injury and the treatment of war casualties, a complete evaluation involves a number of considerations. The course of the bullet must be determined. The site of entry may be anywhere, and the bullet nevertheless lodge in the abdomen. A single wound of entry does not exclude multiple foreign bodies. Avulsion wounds usually contain no foreign body, but the missile producing the avulsion may damage viscera at a distance from the site of the avulsion proper. The possibility of rupture of an organ from the force of the blow must also be considered, even in superficial wounds. In the case of multiple superficial wounds, the course, entry and exit,

and the possibility of entry without exit must be carefully evaluated. Bizarre courses may be due to peculiar positions assumed in combat. Multiple wounds of the thighs, perineum, and scrotum may be produced by a single missile.

The general condition of the patient should be noted; although a patient with an abdominal wound may be initially in relatively good condition, continued absence of shock and of abdominal rigidity is against a diagnosis of peritoneal perforation. Vomiting is not particularly indicative, but if swallowing blood can be excluded, hematemesis indicates esophageal or gastric damage This is of importance in blast injuries.

Inspection of the wound may give important information as to the location of the fragment. Secretion from the wound is important; its nature will indicate perforation of the bladder, urethra, or bowel. Hemorrhage is seldom a diagnostic aid, although bleeding which cannot be controlled by a pressure dressing may be of intra-abdominal or retroperitoneal origin. Abdominal palpation should be done, especially for abdominal rigidity, but the findings should be carefully evaluated as they may be misleading. Tenderness in the renal region does not of itself signify renal damage. Digital examination of the rectum for tears and foreign bodies is important; blood on the examining finger is confirmatory evidence of damage. Coincident rectal examination and catheterization may assist in locating damage to the urethra. Study of the urine for blood and filling the bladder with a measured amount of fluid to determine if all of it can be recovered will determine the status of this organ. Auscultation is less important in the abdomen, but the presence of peristalsis is against intraperitoneal damage.

Roentgen examination is used principally to locate foreign bodies; the condition of the patient usually precludes special technics. The presence of fractures, thoracic abnormalities, subcutaneous emphysema, diaphragmatic hernia or subphrenic gas may be helpful signs, especially as regards the course of the bullet.

Thoraco-abdominal wounds present special problems; a single injury may lead to two diaphragmatic perforations, and their preoperative diagnosis is important because of the need for thoracotomy in such cases. Dysphagia may indicate an esophageal injury. Proper evaluation of all information should determine the type of treatment and the urgency of the case.

LEWIS G. JACOBS, M.D.

THE MUSCULOSKELETAL SYSTEM

Lumbar Myelography by Abrodil. Knut Lindblom. Acta radiol. **27:** 1–7, Jan. 31, 1946. (In English.)

Abrodil in 20 per cent solution was used as a contrast medium for myelography in 75 cases. The technic used was a modification of Arnell's (Acta radiol. **25:** 408, 1944. Abst. in Radiology **46:** 303, 1946). Low spinal anesthesia was given to eliminate discomfort from the irritation caused by the drug and 1.0 c.c. of ephedrin was administered subcutaneously to prevent a fall in blood pressure. The patient was placed on the affected side and four roentgenograms were made in the lateral and various oblique projections. Complications included spasms in the legs for two to four hours in two patients, occasional back pain during injection, and headaches following examination in three patients. Abrodil is heavier than spinal fluid and fills out the spaces around the nerve roots well.

Each of the 75 patients examined complained of low back pain with sciatic radiation: 56 of the myelograms showed definite pathologic changes, 3 were questionable, 15 were normal, and 1 was incomplete. Operations were performed on 30 patients, and in all but one instance the myelographic findings were confirmed.

ELIZABETH A. CLARK, M.D.

Circumscribed Post-Traumatic Osteoporosis of the Lower Ends of the Radius and Ulna. Joseph Buchman. Am. J. Surg. **71:** 267–273, February 1946.

Three cases of post-traumatic osteoporosis of the lower ends of the radius and ulna are reported for the purpose of demonstrating the close relationship between the circumscribed and diffuse forms of osteoporosis and the clinical syndrome, reflex dystrophy of the extremities, the last differing only in that bone changes may be minimal or entirely absent.

The first case showed all three conditions, circumscribed and diffuse osteoporosis and a reflex nervous dystrophy, occurring in the same part at the same time. The second patient had a diffuse type of osteoporosis associated with some muscular atrophy about the involved joints. Twenty-one months later the involved bones had recalcified and the clinical picture was now that of a post-traumatic reflex dystrophy of the extremity. Roentgenograms in the third patient showed what appeared to be a diffuse post-traumatic osteoporosis of the entire carpus and adjacent bone structure superimposed upon a previously existing circumscribed osteoporosis of the semilunar bone, otherwise known as Kienböck's disease

All of these conditions are believed to be due to a functional disturbance of the vasomotor mechanism of the parts involved; differences in the clinical and roentgenological findings merely representing variations in the degree of involvement. This variance in one or another phase of the condition has given rise to a varied terminology referring to what is in all probability the same condition. The more common terms employed in the literature are Sudeck's bone atrophy, acute bone atrophy, post-traumatic osteoporosis, reflex dystrophy of the extremities, reflex nervous dystrophy, segmental angiospasm, and minor causalgia.

JOHN H. FREED, M.D.

Fissures of the Articular Cartilage of the Patella. Occurrence in Multipartite Patella. Charles J. Sutro. Surgery **19:** 251–266, February 1946.

Fissures of the articular cartilage of the patella may occur (1) following trauma which causes this bone to abut against the femur in either flexion or extension, (2) after unusual physical exercise of the knee, or (3) in association with recurrent subluxation or luxation of a normal or multipartite patella. Since the signs and symptoms are similar to those of damaged semilunar cartilages, and as the cartilage of the patella is not shown on the roentgenogram, there has been a tendency to overlook this condition in the differential diagnosis of knee injuries. Early recognition of tears or fissures in the articular cartilage of the patella and also of an anomalous patella will aid materially in planning therapy and in evaluating the prognosis.

The diagnosis of fissures of the articular cartilage of the patella was made in 58 cases over a ten-month period. Thirty-five of the patients had recurrent symptoms of two or more months' duration, and of this

number 11 were operated upon. Ten of these had fissures of the cartilage of the patella, and the eleventh of an anomalous ossicle.

Clinical symptoms are: (1) sharp pain, (2) instability, (3) enlargement of the knee region, and (4) inability to bear weight. The patient may feel or hear a click or sandpaper-like grating on active flexion or extension. Physical findings include effusion and tenderness which becomes localized to the patella. Passive rocking or percussion of the patella produces pain. With the stethoscope, high-pitched cracking sounds are heard on active moving of the knee. Crepitation may also be felt on transverse passive displacement with pressure (contact test), or on active contraction of the quadriceps with the leg in maximal extension. Pain is experienced during this latter procedure when mild manual resistance is applied to the superior pole of the patella (resistance test). Accentuation of subpatellar crepitus may be obtained by flexion of the thigh to 90 degrees while actively flexing and extending the knee (stretching test). In long standing cases, there may be synovial thickening, effusion, and inability to kneel. Fissures of the articular cartilage of the patella may coexist with semilunar cartilage tears or displacements, or with tears of other ligaments about the knee, and one should not strive to restrict the diagnosis to a single entity in every case.

Radiographic findings are few. Views made in the anteroposterior, lateral, and jackknife positions in the author's series revealed 11 instances of anomalous patellae, classified as unilateral and bilateral bipartite, unilateral and bilateral tripartite, and unilateral quadpartite. In 2 additional cases a circumscribed area of subchondral atrophy was found in the central portion of the patella. The roentgen studies confirmed the clinical findings of increased fluid or synovial thickening.

Conditions requiring differentiation include free intra-articular bodies, synovial polyps, osteochondromatosis, chronic infections, semilunar cartilage tears and displacements, osteoarthritis, fractures, and osteochondritis dissecans.

Treatment follows two plans. Acute injuries are given a chance to heal, while recurrent and old injuries which have failed to heal are subjected to arthrotomy. Operative procedures in general follow two patterns: (1) resection of the involved cartilage area, with perforations into the medullary cavity of the patella to facilitate the reparative process; (2) removal of the entire patella or anomalous ossicle. Acute injuries are followed by recurrences of symptoms in a high percentage of cases. Patients operated upon have serviceable knees but are not able to perform strenuous duty or exercise, and should be warned against such activities.

Pathological changes include a partial loss of hyalin matrix, a secondary unmasking of the fibrils of the cartilage, and the presence of superficial and deep fissures. The flat cells normally situated in the outer or tangential layer were found to be either absent or replaced by groups or nests of actively growing elliptical cells resembling those in fibrocartilage. There was evidence of partial repair as exemplified by proliferating young cells on the articular surface and on the walls of the fissures. It appears that this meager attempt at healing was aided by the contiguous synovial fluid without benefit of granulation tissue.

Excellent photographs, diagrams and roentgenograms illustrate the normal and pathological structure of the patella. J. E. WHITELEATHER, M.D.

A Case of Tibia Recurvata. Karen Lubschitz. Acta radiol. **27:** 81–87, Jan. 31, 1946. (In English.)

Tibia recurvata may occur (1) as a congenital anomaly; (2) as a result of metabolic disease in which there is generalized softening of bone; (3) as a result of local softening (*a*) from some unknown cause during the growth period, (*b*) following a lesion of the epiphyseal cartilage, or (*c*) in peripheral, and possibly spastic, paresis of the extremity in conjunction with flexion contracture of the knee and hip; (4) as a static dynamic deformity following ankylosis at the knee joint or in conjunction with hip joint disease in which severe flexion contraction has been produced.

In the author's case an anterior roentgenogram of the knee on the affected side showed the articular interspace apparently obliterated and the patella lower than on the opposite side. In the lateral view, however, it was seen that the interspace was fully preserved and that the curious frontal view was due to a deformity of the upper part of the tibia, the articular surface of which was placed proximo-anteriorly instead of, as normally, proximo-posteriorly. Whereas on the normal side there was an angle of 173 degrees opening backwards, in the upper part of the tibial diaphysis, about opposite the tuberosity of the tibia, there was on the side of the deformity an angle of 160 degrees opening forward, and here the tuberosity seemed to be lacking, or at least there was only a slight indentation corresponding to the insertion of the inferior patellar ligament. The fibula showed a slight convexity from before backward, parallel to the arc described by the tibia.

The deformity is usually an incidental finding, without symptoms. Including the present example, there appear to be only 7 cases in the literature in which the condition could be regarded as a primary anomaly. The author believes that these cases represent the end-result of an endocrine disturbance during the period of growth. ELIZABETH A. CLARK, M.D.

March (Fatigue) Fractures of the Long Bones of the Lower Extremity and Pelvis. Albert L. Leveton. Am. J. Surg. **71:** 222–232, February 1946.

The author adds 12 cases of march fracture, other than metatarsal, to the many recent reports. These were observed in a series of 10,953 orthopedic cases seen in an Army Station Hospital in nine months. The insidious onset and difficulties of early diagnosis are again emphasized. In the early stages the roentgen examination may be negative. Later there is commonly some periosteal thickening, and the fracture tends to spread through the bone after the manner of a crack in ice. The callus increases in amount but is never excessive. In older cases, a zone of increased density may be demonstrable in the area of fracture. Displacement of the fragments is unusual except in femoral neck fractures, where it should be prevented by immobilization. Avoidance of early weight bearing is of importance in all cases.

Six of the fractures in the author's series involved the tibia, 3 the pelvis, 2 the femur, and 1 the fibula. Complete clinical abstracts of the cases are given, with excellent illustrations. JOHN A. COCKE, M.D.

Roentgenographic Examination of the Ankle Joint in Malleolar Fractures. Thorsten Hendelberg. Acta radiol. **27:** 23–42, Jan. 31, 1946. (In English.)

In order to evaluate the mechanism of production of fractures and dislocations at the ankle, the author per-

formed experiments on autopsy material, observed fresh fractures by means of fluoroscopy and arthrography, and made a survey of a ten-year series of such fractures. On manipulation of fresh fractures under local anesthesia, a definite dislocation tendency was observed fluoroscopically in 28 of 42 cases and in some ligamentous injuries could be demonstrated. With the knowledge of the mechanism of fracture thus obtained, the author believes more exact reduction can be accomplished.

The accuracy of fluoroscopy in the detection of injuries to the ligaments was investigated by means of arthrography. In 15 of 16 cases in which no dislocation tendency was observed or in which the fractured malleolus accompanied the talus in dislocation, no contrast medium was observed outside the joint space. Conversely, in 9 of 10 cases in which a dislocation tendency could be demonstrated fluoroscopically, contrast medium was observed outside the joint space. The results of the two methods are thus in good agreement, but the author stresses that the validity of results from arthrography for capsular injury is lost if the examination is not made within 24 hours following trauma, because of coagulation of blood at the site of injury.

By means of a wooden wedge driven between the tibia and fibula anteriorly, injury to the anterior tibiofibular ligament was reproduced, and it was found that no widening of the space can be demonstrated in routine roentgenograms, although changes can be observed by fluoroscopy and by arthrography. Also fractures of the posterior tibial surface were produced in autopsy specimens, and roentgenograms were made in the two routine positions. It was found that this limited study was inadequate to visualize the fracture line, to estimate the size of the fragment, or to ascertain the extent of the injury at the articular surface, and the importance of oblique views when this type of fracture is suspected is emphasized. ELIZABETH A. CLARK, M.D.

Roentgenologic Skeletal Changes in Myeloma in Childhood (Platyspondylia generalisata myelomatosa). Gösta Jansson. Acta radiol. **27:** 73–80, Jan. 31, 1946. (In English.)

Only 8 cases of multiple myeloma in children are said to have been reported up to 1939. The author presents a case in a 9-year-old boy whose chief complaints were recurrent fever and extreme back pain. Progressive anemia occurred until, a few days before death, the hemoglobin was 14 per cent. Roentgenologically, the bones of the pelvis, upper femora, the knees and the shoulder joints revealed multiple cystic appearing areas of bone destruction. There were generalized decalcification and a marked platyspondylisis throughout the spine. The roentgenographic appearance could not be differentiated from that of Schüller-Christian's disease, and the diagnosis was not made until autopsy was performed. Even had a premortem diagnosis been made, the course would probably have been unchanged, as myeloma is rapidly fatal in the young and there is no effective treatment.

In other reported cases, there has been variation in the extent of the bony lesions, but involvement of the vertebrae and punched-out lesions elsewhere are characteristic. Severe progressive anemia occurred in the cases in which blood studies were reported. Renal calcification was described in two cases.

ELIZABETH A. CLARK, M.D.

GYNECOLOGY AND OBSTETRICS

Artificial Pneumoperitoneum by Cul-de-Sac Puncture. A New Technic for Pelvic Pneumograms. Albert Decker. New York State J. Med. **46:** 314–317, Feb. 1, 1946.

The introduction into the abdomen of air, carbon dioxide, or oxygen, under pressure, has long been used as a diagnostic procedure. As an aid in roentgen examination, it was perfected some twenty-five years ago, but it has never been extensively employed. Stein, on the basis of a large experience, states that pneumograms are more informative and less harmful in some cases than hysterosalpingography. He has combined the two procedures in selected cases with excellent results. In general carbon dioxide has been the medium of choice and the transuterine route has been preferred to the transabdominal.

Recently, experience with the production of pneumoperitoneum in conjunction with "culdoscopy" (Decker and Cherry: Am. J. Surg. **40:** 44, 1944) has suggested a new, safe, and simple technic for the introduction of air or carbon dioxide into the peritoneal cavity. It utilizes the negative pressure created in the abdomen with the patient in the knee-chest position. A short, beveled $4^1/_2$-inch needle, 20 gauge, attached to a 2-c.c. syringe, is pressed against the posterior vaginal wall at a point just above the cervix. The needle point is directed toward the center of the pelvis and pushed through the vaginal vault into the cul-de-sac. When the plunger of the syringe is removed, an immediate and spontaneous pneumoperitoneum results. The inrush of air can be attested by the sound created in the syringe by alternately opening and closing the aperture with the thumb. When it is desired to substitute carbon dioxide for air, a special cannula can be used. Carbon dioxide has the advantage of quick absorption, but when pneumograms are to be taken several hours after the introduction of gas, it is advisable to use air to insure continuation of the pneumoperitoneum.

The advantages of this new technic are as follows: (1) the psychic aversion to abdominal puncture is avoided; (2) the air is not introduced under pressure, so that the danger of air embolism is avoided; (3) the pelvis is notoriously less readily infected than the abdomen; (4) very little apparatus is needed and no local anesthesia is required; (5) danger of injury to the intestine is minimized, as the position removes them from the pelvis; (6) when the special cannula is used for the production of transvaginal pneumoperitoneum, the pelvis is available for endoscopic examination (culdoscopy).

The author presents one case in detail, illustrating the value of this procedure in the diagnosis of a pelvic tumor. BERNARD S. KALAYJIAN, M.D.

Radiologic Diagnosis of Ectopic Pregnancy. Richard H. Marshak. New York State J. Med. **46:** 317–318, Feb. 1, 1946.

The author records a case in which uterosalpingography was performed to determine the cause of uterine bleeding and an ectopic gestation was accidentally discovered. Two films were taken: one with 2 c.c. of viscorayopaque and the next with 4 c.c. These showed a normal uterine cavity and a normal right tube. In the mid-portion of the left tube was a circular defect about 1.5 cm. in diameter. A diagnosis of left tubal pregnancy was made and confirmed by exploration,

which also showed a small localized hematocele in the cul-de-sac. Although an ectopic pregnancy had been suspected in this case, laboratory findings, including a Friedman test, were so completely negative that laparotomy had been postponed.

The author raises the question as to the advisability of doing uterosalpingography more routinely to aid in the diagnosis of ectopic pregnancy. This diagnosis in unruptured cases or in cases in which there has been a pin-point rupture with a localized hematocele may be very difficult. Also it is not unusual to explore a patient and find no abnormality in the tube. It is in the type of case described in this article that no harm can accrue from salpingography if it is performed under proper circumstances. In the presence of a positive pregnancy test, the procedure is, of course, contraindicated unless a viable intrauterine fetus is excluded. It is not necessary to use more than 4 c.c. of the opaque medium to visualize the tube, and this should be injected slowly, preferably under fluoroscopic control. The author believes that if there are no ill effects from salpingography, it may prove to be preferable to any type of operative procedure. If, on the other hand, further experience with more cases reveals that there is a danger, incision in the cul-de-sac is unquestionably more advantageous. BERNARD S. KALAYJIAN, M.D.

THE GENITO-URINARY SYSTEM

Percutaneous Puncture of Renal Cysts and Tumors. Knut Lindblom. Acta radiol. **27:** 66–72, Jan. 31, 1946. (In English.)

The occurrence of renal tumors and of solitary cysts in elderly persons is not infrequently a diagnostic problem, and surgical exploration in the older age group is associated with increased risk. The author suggests, therefore, percutaneous puncture of the renal mass with injection of diodrast as a diagnostic procedure. In the 6 reported cases, localization was carried out under fluoroscopic observation, and the diagnosis of solitary cyst was made in five cases and of hypernephroma in the sixth. Complications included dull pain at the site of injection in 3 cases and mild febrile reaction in another. ELIZABETH A. CLARK, M.D.

THE BLOOD VESSELS

Early Diagnosis of Phlebothrombosis. William R. Moses. New England J. Med. **234:** 288–291, Feb. 28, 1946.

The high incidence of phlebothrombosis of the leg veins, with its lethal potentialities, is discussed. Considerable stress is placed on the early diagnosis of bland venous thrombi so that measures for the prevention of pulmonary embolism may be instituted. In the author's experience, venography is of extremely limited value in the early diagnosis of phlebothrombosis of the calf veins. Homan's test is also thought to involve certain unavoidable fallacies resulting in a dangerously large number of false-positive and negative responses. A clinical test for the differentiation of early phlebothrombosis and the lesions simulating it is described, and the results are outlined.

Phlebography: Anatomical, Physiopathological, and Clinical Considerations. Luigi Imperati. Arch. di radiol. (Naples) **17:** 421–440, November-December 1941.

The author illustrates, by presenting seventeen phlebograms, some of the uses of phlebography in the differential diagnosis of various lesions involving the veins and in obtaining data about their anatomy and physiology. He used both uroselectan B and perabrodil as opaque media. E. T. LEDDY, M.D.

TECHNIC

Duplication of Radiography by Solarisation. G. H. Illingworth. Brit. J. Radiol. **19:** 66–69, February 1946.

Improved and more dependable results in copying roentgen films are obtained by a modification of the solarization method suggested by Henny, Bird and Stauffer (Am. J. Roentgenol. **49:** 554, 1943). Both surfaces of the film are fogged, a contact exposure is then made, the film is developed in a metol-hydroquinone developer, fixed in hypo, washed, cleared in Farmer's reducer, again washed, and dried.

SYDNEY J. HAWLEY, M.D.

RADIOTHERAPY

NEOPLASMS

Evaluation of the Treatment of Cancer of the Breast, with a Suggestion for Its Modification. Charles Stanley White. Am. J. Surg. **71:** 205–209, February 1946.

The author feels that in the treatment of cancer of the breast we are at a place "where the prospects of reducing the early mortality or extending the span of life seems to have reached an impasse, unless we can better apply the tools at our disposal." He emphasizes the importance of adequate pathologic examination for diagnosis. Punch biopsy he considers of little value; only when positive for cancer can it be given any consideration. Again, metastatic deposits in the regional lymph nodes can be diagnosed only by the pathologist. They must be searched for carefully. Palpation will not differentiate the neoplastic from the inflamed node. The value of pathologic examination is commensurate with the adequacy of surgical excision, the diligence with which the excised tissue is examined, and the pains with which microscopic studies are done.

Radiation and surgery are the only available means of combating carcinoma of the breast, but it is questionable whether we have exhausted their possibilities, particularly as a dual method of attack. The author believes that concentrated preoperative irradiation should be given for two or three days, followed by surgery in four or five days.

Since it has been found possible to obtain a two-year arrest of the malignant process by irradiation, the author suggests the advisability of giving periodic courses of irradiation spaced at two- or three-year intervals, believing that thereby feeble cancer cells which have become activated after a single series of treatments may be attenuated and eventually destroyed. He is putting this regimen into effect in cases of apparent cure and hopes in five years to have enough data on the method to encourage further studies or to warrent abandonment of the principle of surgery plus periodic irradiation. ARTHUR W. PRYDE, M.D.

Roentgen Treatment of Carcinoma of the Breast. Carlo Guarini. Arch di radiol. (Naples) **17:** 189–317, May-June and July-August 1941.

After an exhaustive review of the world's literature on the subject (the bibliography of this paper covers seven pages), Guarini presents his own experience with roentgen therapy for carcinoma of the breast based on 750 cases from his private practice and from the Instituto Foto-radio-terapico in Naples. None of his cases fell in Steinthal's group I. Of 47 patients in group II (Steinthal), 19 were living and well after five years, and of 181 patients in group III, 17 were living and well after five years.

Guarini has treated 138 recurrent cases, of which 60 were controlled for five years; 337 cases treated postoperatively gave a five-year survival of 227. Incidentally he advises routine sterilization of the ovaries by x-rays.

E. T. LEDDY, M.D.

Radiation Treatment of Carcinoma of the Female Urethra. James Jackman and Ralph D. Bacon. Pennsylvania M. J. **49:** 518–519, February 1946.

The technic used in the treatment of carcinoma of the urethra, the complications encountered, and the preliminary results in the treatment of 8 cases are described in this article.

Inspection of the urethra usually reveals an area of tumefaction around the external meatus, and gross differentiation from caruncle is often impossible. Diagnosis must depend on histological examination.

Radiation is given through a cone 2 to 4 cm. in diameter, placed directly against the external meatus, 300 r (in air) being given daily for five or six days (200 kv., 15 ma., 50 cm. distance, Thoraeus filter). This is followed immediately by the insertion around the urethra of three or four 10-mg. needles of radium having a filter equivalent to 0.5 mm. of platinum, for a gamma roentgen dose of 3,000 to 4,000. The combined dosage from both x-rays and radium is about 7 tissue erythema doses.

Radiation beyond this amount is not well tolerated and may cause extreme discomfort. A urethral stricture may develop which will necessitate monthly dilatations. For local recurrence further cauterization and local radium therapy is used.

Of the 8 patients treated, 5 (possibly 6) are free of the disease for a few months to five years after preliminary treatment. There has been one death and one recurrence. All the cases were diagnosed histologically as squamous carcinoma.

JOSEPH T. DANZER, M.D.

Obscure Lymphosarcoma. Howard A. Ball. California & West. Med. **64:** 82–83, February 1946.

A woman 53 years of age had generalized discrete lymphadenopathy, a palpable tender spleen, moderately enlarged lymph nodes, and a white blood count of 10,150 with 64 per cent lymphocytes, which would be equivalent to about 6,500 lymphocytes per cubic millimeter. An inguinal node was removed for study, and the microscopic findings were reported as compatible with leukemic lymphadenosis but not warranting a diagnosis of lymphosarcoma.

X-ray therapy was given to the spleen, both sides of the neck, both axillae, and both groins, in a system of rotation. Five days after 100 r had been delivered over the spleen, the circulating lymphocytes had dropped to 1,600 per cubic millimeter. Four days later, this figure had increased to 3,500.

During the next four months, a total of 1,500 r of x-ray therapy was given, 300 r over the spleen. At four and a half months, a reversal in the differential count occurred. While nine counts in the initial period had shown an average of 60 per cent of the circulating white blood cells to be lymphocytes, fourteen counts during the next year and a half averaged only 33 per cent lymphocytes. Over a year after this the patient was again seen with bleeding from the nose, anorexia, weakness, loss of weight, and migrating skeletal pains. The spleen and a few small lymph nodes were palpable, and the white blood count showed a total of only 2,000 cells per cubic millimeter with 68 per cent lymphocytes. Death occurred three weeks later, and autopsy showed scattered foci of neoplasm along the spine, ribs, celiac axis, and in the hilus of the spleen. The spleen and liver were moderately enlarged and the kidney parenchyma was infiltrated with tumor. Both the femoral and sternal bone marrow were almost white with neoplastic involvement. The final diagnosis was lymphosarcoma.

The author concludes that in such cases, the areas of most extensive involvement as seen at autopsy are for the most part those not subjected to radiation therapy and asks whether, in a case of systemic lymphadenopathy that responds well to external radiation, we should not "also include treatment to the visceral gland-bearing areas lying chiefly along the mid-line of the thorax and abdomen, even in the absence of symptoms referable to them."

BERNARD S. KALAYJIAN, M.D.

Radioactive Phosphorus as a Therapeutic Agent. A Review of the Literature and Analysis of the Results of Treatment of 155 Patients with Various Blood Dyscrasias, Lymphomas, and Other Malignant Neoplastic Diseases. Edward H. Reinhard, Carl V. Moore, Olga S. Bierbaum, and Sherwood Moore, with Appendix by Martin Kamen. J. Lab. & Clin. Med. **31:** 107–218, February 1946.

This article of over 100 pages (1) reviews in detail the literature covering the use of radioactive phosphorus; (2) summarizes the experimental work which provided the rationale for the therapeutic use of that isotope; (3) describes the authors' own experience during the last four years in 155 cases of hematologic dyscrasias or malignant neoplastic diseases; (4) evaluates the effectiveness of this agent as compared with older methods of treatment.

Thirty patients with *polycythemia vera* were treated with eminently satisfactory results. The symptoms disappeared and the red blood counts returned to normal after a latent period. The dosage of P^{32} must be individualized, as it is impossible to predict how much therapy any given patient will require for a satisfactory response. No other method yet used has produced comparable results, but whether or not life is prolonged remains to be seen. Detailed case reports and tabulated summaries lend emphasis to the more general statements made in the discussion.

Myelogenous leukemia was treated in 39 unselected patients. Here again treatment must be highly individualized, always with an attempt to keep the blood count as nearly normal as possible. The results in this group of cases are summarized as follows: (1) P^{32} has not succeeded in curing any patient; (2) P^{32} has very little effect on the course of acute or subacute myelogenous leukemia; (3) P^{32} produces clinical and hematologic remissions roughly comparable to those induced

by roentgen radiation and Fowler's solution in nearly all subjects with the chronic form of the disease. The main advantages of P^{32} over roentgen rays are the absence of radiation sickness and the more constant irradiation effect, which is thought to keep the blood count "on a more even keel." The principal toxic effects to be avoided are: leukopenia, thrombocytopenia, and aplastic anemia. In an occasional case relief of joint or deep bone pain or reduction in size of lymph nodes which may be causing pressure symptoms may not be as complete with radioactive phosphorus as with x-ray. It is, of course, too early to determine whether prolongation of life is produced by this method of therapy. A treatment schedule is furnished, and detailed case histories and tabulated summaries give valuable emphasis to the generalizations made in the discussion.

Forty-five unselected cases of *lymphatic leukemia* were treated. In the chronic and subacute forms the history of symptoms is usually shorter than in myelogenous leukemia. In general, in these cases the treatment with P^{32} was highly beneficial, with alleviation of symptoms and even most of the signs of the disease. Tables on the complete series and detailed histories of two cases which responded in a typical fashion are given.

Fifteen patients with *leukosarcoma* or acute lymphatic leukemia were treated, but all died. Comparison with x-ray irradiation showed that P^{32} was no more effective in relieving symptoms. The hematologic remissions were similar to those produced with external irradiation, but reduction in localized adenopathy and splenomegaly was not quite as successful as with external irradiation. There is no indication that P^{32} is likely to prolong life more than does x-ray.

Monocytic leukemia was treated with P^{32} in 10 patients. The results were uniformly disappointing.

Hodgkin's disease was treated in 6 patients and P^{32} was found to be inferior to x-radiation.

A group of 5 patients with *lymphosarcoma, reticulum-cell sarcoma,* or *giant follicular lymphoblastoma* were treated. It is the authors' impression that roentgen irradiation is more effective and less dangerous than P^{32} for this group of diseases.

Multiple myeloma was treated in 8 patients, but P^{32} did not prove to be a valuable therapeutic agent. It was the authors' impression that the treatment significantly shortened the duration of life in two patients by producing severe leukopenia and thrombocytopenia.

Three patients with *Ewing's sarcoma,* 1 with *malignant melanoma,* 1 with *anaplastic carcinoma,* 2 with *mycosis fungoides* and 1 with *xanthomatosis* were treated, but the results were not regarded as satisfactory.

The main article is followed by an appendix by Martin A. Kamen on the assaying of radioactive phosphorus. Investigation as to the best method of assay is being carried on. SYDNEY F. THOMAS, M.D.

A Study of the Distribution of Radioactive Phosphorus in Three Cases of Cancer. Arne Forssberg. Acta radiol. **27:** 88–92, Jan. 31, 1946. (In English.)

One case of hypernephroma with metastases to bone and skin and two cases of carcinoma of the breast with widespread metastases were treated with radioactive phosphorus, and the tissues were analyzed quantitatively after death, the values obtained being corrected for decay back to the time of death. The findings agree with those of other workers and with the previous work of the author on experimental animals (Acta radiol. 26: 523, 1945. Abst. in Radiology **47:** 550, 1946), in that organs of higher metabolic rate were found to contain larger quantities of P^{32}. Likewise, tumor tissue in the organs of high metabolic rate, *i.e.*, liver, kidney, and spleen, did not contain more P^{32} than the normal portion of the same organ. In each of the three cases, the tumor tissue in bone contained appreciably more P^{32} than corresponding normal bone, although values did not exceed those for the organs of high metabolic rate. Similarly an increase over the amount in corresponding normal tissue was found in skin metastases in one case and in involved mammary tissue in another. The author's observations suggest to him the possibility of treatment of bone metastases by P^{32}, but the effect of the high concentrations of the isotope upon the blood-forming elements requires further investigation before any conclusion on this point can be reached.

ELIZABETH A. CLARK, M.D.

NON-NEOPLASTIC DISEASE

The Struggle with Tinea. Combined Treatment with Roentgen Rays and Thallium. Silvio Parenti. Arch. di radiol. (Naples) **17:** 460–480, November-December 1941.

The author has treated with x-rays and thallium acetate 146 cases of tinea with satisfactory results. He also presents a detailed discussion of ringworm and methods of treating it, and adds an extensive bibliography.

E. T. LEDDY, M.D.

Physical Therapy of Sinusitis by the Combined Action of Radiations. Giuseppe Muscettola. Arch. di radiol. (Naples) **17:** 318–337, July-August 1941.

The author treats sinusitis with roentgen rays (120–150 kv. and 2–3 ma.) in doses of not more than 75 r, seldom given more than four times at four- to six-day intervals, with good results. No statistics are given. Both acute and chronic sinusitis receive short-wave and infra-red therapy in addition.

E. T. LEDDY, M.D.

Roentgen Therapy for Varicose Ulcer. Aldo Pergrossi. Arch. di radiol. (Naples) **17:** 357–370, September-October 1941.

A group of 4 cases of varicose ulcer was treated by local irradiation. A second group, of 6, was treated by irradiation of Scarpa's triangle, a third, of 10 cases, by irradiation of the contralateral lumbar spine, and a fourth group, of 5 cases, by lumbar homolateral irradiation. The immediate benefit was striking but the result in all cases was only temporary. The author regards the effect produced as due to an influence on the sympathetic system. The method could be used in conjunction with the surgical treatment of the lesion.

E. T. LEDDY, M.D.

h radioactive
zed quantit
eing correcte
findings agre
previous work
cta radiol. 26
1946), in that
nd to contain
r tissue in the
kidney, and
e normal pos
ree cases, the
bly more po
gh values did
etabolic rate
corresponding
es in one case
nother. The
possibility of
the effect of
on the blood
gation before
ed.
ARK, M.D.

SE

reatment with
renti. Arch.
ber-December

thallium ace
ults. He also
and methods
ography.
DDV, M.D.

nbined Action
rch. di radiol

en rays (12)
ore than 75 r,
ur- to six-day
cs are given.
ort-wave and

DDV, M.D.

Aldo Pier
-370, Septem

as treated by
as treated by
of 10 cases,
r spine, and s
ateral irradia
but the result
uthor regards
e on the sym
used in con
ue lesion.
DDV, M.D.